



REPORT

ON THE

LOCAL DEPARTMENT

OF

AGRICULTURE,

BARBADOS,

1911-12.

T. E. KING & Co.,—Printers to the Government of Barbados.

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Report of the Local Department of Agriculture, Barbados,

FOR THE FINANCIAL YEAR 1911—12.

STAFF.

Superintendent of Agriculture.....	JOHN R. BOVELL, I.S.O., F.L.S., F.C.S.
Assistant Superintendent.....	WILLIAM NOWELL, D.I.C.
First Field Assistant.....	EDMUND M. PETERKIN.
Second Field Assistant.....	MILTON S. GOODMAN.
Assistant in charge of Nurseries.....	ERNEST H. BARROW.
Chief Clerk.....	HUGH O. RAMSEY.
Second Clerk.....	ROBERT A. DEAR.
Third Clerk.....	CECIL B. FOSTER.

ESTABLISHMENT.

During the financial year ended March 31, 1912 several changes occurred in the staff of the Department, owing to the promotion of some of the officers and the resignation of others. On September 13, Mr. W. Nowell, D.I.C., was appointed Assistant Superintendent of Agriculture and Mr. E. M. Peterkin, who had been acting as the Assistant Superintendent of Agriculture, reverted to his substantive appointment of First Field Assistant. Consequent on this, the two other officers Mr. M. S. Goodman and Mr. E. H. Barrow, who had been acting as First and Second Field Assistants respectively, also reverted to their substantive posts.

On May 15, 1911, Mr. C. E. Stoute the Chief Clerk, who had been an officer of the Department for twelve and a half years, was promoted to the post of Inland Revenue Officer and Clerk to the Police Magistrate of District "C." Mr. Stoute was a very capable, energetic and painstaking officer, and it affords me much pleasure to record here my appreciation of the valuable assistance he always so readily and willingly rendered me.

During the period under review, Mr. J. R. Bovell the Superintendent of Agriculture was absent from the Island from July 6 to 15. During Mr. Bovell's absence on this occasion Mr. C. E. Stoute, who was then Inland Revenue Officer and Clerk to the Police Magistrate of District "C", acted as Superintendent of Agriculture. The Superintendent of Agriculture was also absent from the Island from January 22 to February 7 attending the Agricultural Conference held in Trinidad, when the Assistant Superintendent acted as Superintendent of Agriculture.

On September 21st, Mr. H. F. Parris the Junior Clerk tendered his resignation and Mr. C. B. Foster was appointed in his stead.

On December 31st, 1911, Mr. D. V. Barker the Third Clerk tendered his resignation to accept an appointment in the Office of the Imperial Department of Agriculture, and Mr. R. A. Dear was appointed to the vacant post.

EXPENDITURE.

	£	s.	d.
Salaries	1,434	6	7
Incidentals for sugar cane, cotton and other experiments ...	410	19	9
Upkeep of Botanic Station	114	13	8
Fumigation of plants	8	5	3
Purchase of goats	4	0	0
Exhibitions, Canadian and Local	85	19	1
Total	2,058	4	4

RECEIPTS.

	£	s.	d.
Plants in pots	37	19	7½
Canes, cotton, cassava, corn, sweet potatoes, &c., &c., grown on land rented from Waterford plantation ...	55	15	4½
Sundries:—Collecting and drying mahogany seeds, tamarinds sold from trees at Pavilion &c.	4	10	6½
Total	98	5	6½

REPAIRS TO BUILDINGS, ETC.

During the year minor repairs were made to the office and outbuildings. Minor repairs and the painting of the outer wood work of the house and certain of the outbuildings, were executed at Codrington, where the nurseries for the seedling sugar canes and other plants, are situated and where the Superintendent of Agriculture resides.

DISTRIBUTION OF ECONOMIC PLANTS.

The receipts for the sale of plants etc., during the financial year 1911-1912 amounted to £98 5. 6½.

The plants distributed locally and abroad for the year are as follows :

Cane plants, (of these, forty cases, fifteen barrels and one box containing approximately 6,796 plants were packed in damp powdered charcoal)				66,006	plants
Cane seeds	...	...	...	33	packets
Cassava cuttings	...	...	...	18	varieties
Tannia corms & tuberous rhizomes	...	...	...	29	"
Guinea corn seed	...	...	...	1	gallon
Banana suckers	...	...	...	8	
Cotton seed	...	...	...	842	lb.
Grafted mangos	...	...	...	92	plants
Grafted Avocado pears	...	...	...	20	plants
Lime	...	...	...	18	plants
Ponderosa lemon	...	...	...	4	plants
Breadnut	...	...	...	1	plant
Melon seed	...	...	...	30	packets
Vegetable seed	...	...	...	45	"
Lignum vitae seed	...	...	...	1,000	
Screw Pine seeds (<i>Fandanus utilis</i>)	...	...	...	2½	bags
do. do. plants	...	...	...	2	
Sesamum seed	...	...	...	6	lb.
Sorrel seed (red)	...	...	...	15	lb.
Papaw seed	...	...	...	1	packet
Horse radish	...	...	...	1	plant
Sweet potatoes	...	...	...	252	roots
" " seed	...	...	...	1	packet
Palms and ornamental plants	...	...	...	622	
Plants for Arbor Day	...	...	...	1,232	
Mahogany seed	...	...	...	2	barrels
Seeds of leguminous plants	...	...	...	80	packets
Woolly Pyrol seed	...	...	...	2	gallons

PLANTS IMPORTED AND DISTRIBUTED LOCALLY.

Grafted mangos	...	...	...	5	plants
Budded Tangerine orange	...	...	...	5	"
" Mandarin orange	...	...	...	2	"
" Navel orange	...	...	...	40	"
Grape fruit	...	...	...	14	"
Shaddock	...	...	...	9	"
Cocoanuts	...	...	...	20	"
Palms	...	...	...	10	"
Pine Apple	...	...	...	100	"
Star Apple	...	...	...	1	plant
Sapodilla	...	...	...	3	plants
Cotton seed	...	...	...	20	lb.
Garlic	...	...	...	1	"
Onion seed	...	...	...	3	"
Balsam seed	...	...	...	2	packets
Hevea brasiliensis	...	...	...	18	plants

EXPERIMENTS WITH SUGAR-CANES.

As the results obtained with different varieties of the sugar-cane, as well as with different chemical fertilizers at the various experiment stations, are fully dealt with in a separate report and in a pamphlet, it is unnecessary to do more than briefly refer to them here.

For the period under review, experiments were conducted on fifteen estates with different varieties of the sugar-cane obtained mainly from seed, and grown in comparison with the White Transparent as a standard. These were carried out in duplicate, with the older varieties that had proved worthy of cultivation, at Carrington, Coverley, Pine,

Waterford, Clifton, Clifton Hall, Henley and Lemon Arbor plantations. Single experiments with the older and some of the newer varieties were carried out at Dodds, Sunbury, Hampton, Hannays, Ridge, Brighton and Lower Estate plantations. These estates are representative of the various districts of the island, with the exception of the district in which the parish of St. Lucy is situated. In that parish the experiments were continued as in the past at Husbands plantation, but owing to the drought that was experienced when the cuttings were planted, so few grew that as the results would have been valueless, the few that did reach maturity were not reaped. At Dodds, in addition to the experiments mentioned above, the remainder for the land suitable for experimental purposes is occupied with the newer seedlings in varying stages of experimentation. These varieties as they prove of value are taken to the different estates mentioned above and their cultivation carried on under normal plantation conditions in comparison with the White Transparent, the standard sugar-cane. If the results of these latter experiments warrant it, the planters are recommended to grow them on small areas in comparison with the varieties found to do best on their estates, and to gradually extend their cultivation if they prove suitable.

In addition to the experiments mentioned above, a series of experiments which may be called co-operative experiments, were carried on with the help of some of the planters on various estates. In these experiments the better varieties of the seedling sugar-canes were grown in comparison with the White Transparent or some fairly well known seedling as a standard. The sugar-canes from each variety were reaped separately, and the juice extracted, and a sample analysed. Where scales were available the sugar-canes were also weighed. For the reaping season 1912 these experiments were carried on at Lemon Arbor, Ellesmere, Woodland, Upton, Society, Lower Estate, Todds and Spencers.

In addition to the experiments carried on at Dodds with different varieties of the sugar-cane, experiments have been carried on with different chemical fertilizers. The same fertilizer has now been applied each year for the past nineteen years to the same plot, so the results are becoming more and more valuable as each year goes by. The average results so far obtained may be now said to indicate the lines on which sugar-canes grown under conditions similar to those at Dodds should be manured.

In 1911 experiments were started to ascertain which of the following nitrogenous fertilizers, viz., sulphate of ammonia, nitrate of soda and nitrate of lime would, under the conditions prevailing at Dodds, give the best results. The experiments were carried out in South Grape Tree field at Summervale. This field had sweet potatoes grown on it in May 1910. After these had been reaped the land was manured with farmyard manure towards the close of the year, and sheep manure was applied at the rate of one ton per acre. Each plot consisted of a quarter of an acre and sufficient of each fertilizer was applied on July 4, 1911, to supply nitrogen at the rate of 60 lb. per acre. The results are given in table I.

TABLE I.
COMPARATIVE RESULTS WITH CERTAIN NITROGENOUS FERTILIZERS.

SUMMERSVALE PLANTATION.			SOUTH GRAPE TREE FIELD.			PLANT CANES.			1912.					
Name of fertilizer.	...	...	Cane, tons per acre.	Per cent. of juice by mill.	NORMAL JUICE.						Gallons of juice per acre.	Saccharose lb. per acre.	Increase on sulphate of ammonia.	Per cent. of increase on sulphate of ammonia.
					Sp. Gr. $\frac{30^{\circ}}{16.6^{\circ}}$	Lb. per gallon of			Quotient of purity.	Glucose ratio.				
						Saccharose.	Glucose.	Solids not sugar.						
Sulphate of ammonia	...	...	26.63	62.00	1.0875	2.21	.043	.127	92.86	1.95	3,401	7,516	...	2.45
Nitrate of lime	...	...	27.06	60.75	1.0902	2.28	.027	.143	93.06	1.18	3,377	7,700	184	2.66
Nitrate of soda	...	...	27.41	60.00	1.0888	2.28	.039	.101	94.21	1.71	3,384	7,716	200	2.66

As will be seen from the table, the differences in yield this year were not very great and come within the probable error incident to sugar-cane experiments.

During the reaping season of 1912 experiments were started for the purpose of ascertaining what is the probable error incident to the carrying out of the sugar-cane experiments in Barbados. For this purpose the two centre rows of four four-row plots of B. 376, adjoining one another on the level portion of Watch field at Summervale plantation where the whole field had been treated alike, were reaped separately, the juice analysed and the results calculated to the acre, like all the sugar-cane variety experiment plots. The results are given in table II.

TABLE II.

SUMMERYALE. WATCH FIELD. PLANT CANES. 1912.

Name of cane.	Cane, tons per acre.	Per cent. by number of rotten canes.	Per cent. juice by mill.	NORMAL JUICE.						Gallons juice per acre.	Saccharose lb. per acre.	Per cent. above or below the average which is 74.2lb. of saccharose per acre.
				Sp. Gr. $\frac{90^{\circ}}{16.6^{\circ}}$	Lb. per gallon of			Quotient of purity.	Glucose ratio.			
					Saccharose.	Glucose.	Solids not sugar.					
B 376 Plot I	...	...	66.75	1.0893	2.19	.083	.157	90.12	3.79	3,729	8,167	+ 9.74
B 376 Plot II	...	...	62.75	1.0884	2.18	.074	.156	90.46	3.39	3,589	7,824	+ 5.13
R 376 Plot III	...	...	63.25	1.0875	2.11	.096	.174	88.66	4.55	3,107	6,556	- 11.91
B 376 Plot IV	...	...	63.50	1.0875	2.14	.078	.162	89.92	3.64	3,374	7,220	- 2.98

As will be seen from the table the difference between the yield of the plot which was highest and that which was lowest amounted this year to 1,611 lb. saccharose per acre, a difference of 25 per cent. Further, that the difference between the highest and the average of the four plots was +9.74 per cent., and between the lowest and the average -11.91 per cent. These results confirm what Prof. d'Albuquerque and the writer have repeatedly stated in the reports of the sugar-cane experiments, viz:—that too much reliance cannot be placed on the results of one year's work. That these results are not exceptional, and are what might be expected may be judged from the following extract of a paper in the Journal of the Board of Agriculture, United Kingdom, on "The Experimental Error in Field Trials" by A. D. Hall, M.A., F.R.S., the Director of the Rothamsted Experimental Station, Herts, England. The paper is based on results obtained with two unmanured plots on the grass field at Rothamsted for fifty years, *i.e.*, from 1856 to 1905. Mr. Hall states, "Looking at the relative yield set out in table I, we see that plot 12 in 37 years out of 50 gave a bigger crop than plot 3, but on 13 occasions it gave less: taking the mean of the whole period, its relative yield is 110 for plot 3. Granting, however, that it is really about 10 per cent. the better plot, there have been many years when it gave a 30 per cent. better yield, and in one year it was 96 per cent. better; on the other hand, it was on two occasions 10 per cent. below plot 3."

In the last two reports I stated that Mr. E. L. Hollinsed, the attorney and manager of the Society and College estates, was good enough to carry out certain experiments for the purpose of ascertaining what effect the application of phosphates had in the red soil district, as it had been found for many years on the black soils at Dodds that the application of this fertilizer caused a decreased yield. In this experiment to two fields, Jubo's Head and Mill field, there was applied, in the case of the plant canes, nitrate of potash, at the rate of 100 lb. per acre, early in the year, followed as soon as the rainy season set in by 200 lb. of sulphate of ammonia per acre. In addition the half of each field received 100 lb. of superphosphate of lime per acre. As first ratoons each field received 100 lb. of nitrate of potash per acre, applied soon after the sugar-canes commenced to grow, followed in June by 200 lb. of sulphate of ammonia per acre. As second ratoons each field received soon after the sugar-canes commenced to grow, 100 lb. of nitrate of potash per acre, followed as soon as the rainy season set in by 200 lb. of sulphate of ammonia per acre, and six weeks after by a further application of 150 lb. of sulphate of ammonia per acre. The results are given in table III. and as will be seen therefrom the loss for the application of the superphosphate was for the plant canes 87½ lb. of saccharose per acre; the gain for the first ratoons was 232 lb. of saccharose per acre, and the loss for the second ratoons was 317 lb. of saccharose per acre. It would seem therefore that the loss on the three crops from the application of the phosphate amounted in the aggregate to 907 lb. of saccharose plus the cost of the superphosphate of lime. As it is a matter of importance that the question of whether the application of phosphates is, under the conditions prevailing in Barbados, necessary or not, Mr. Hollinsed has been good enough to promise to continue the experiments, and two other gentlemen have promised to start similar experiments this year, so as to try and settle the matter as soon as possible.

In my annual report for 1909-10 I mentioned that Dr. C. E. Gooding, M.C.P., of Stirling Plantation, had been good enough to carry out an experiment for the purpose of ascertaining what effect the cutting out of "Dead Hearts," *i.e.*, the removal with a sharp knife of all growing sugar-canes attacked by the moth borer (*Diatroea saccharalis*, Fabr.), had on the yield, and that the loss from cutting out the "Dead Hearts" in 1909 was approximately one-third of a ton of sugar per acre. In last year's report I stated that owing to the difficulty of obtaining labourers at the right time, the planters who had promised to carry out similar experiments had been unable to do so, but that fourteen planters had promised to repeat the experiment. I regret now to report that owing to a variety of causes only two of those gentlemen who had promised to conduct the experiments sent in their results, viz: Dr. C. E. Gooding, M.C.P. of Stirling, and Mr. A. A. Evelyn, of Spencers. The results are given in table IV, and as will be observed therefrom there was an increase of 312 lb. saccharose per acre where the "Dead Hearts" were not cut out.

TABLE III.

1912.

MANURIAL EXPERIMENTS.

JUBO'S HEAD AND MILL FIELDS.

SOCIETY PLANTATION.

SOCIETY PLANTATION.													
Manure applied.	Name or No. of cane.	Name of field.	Cane, tons per acre.	NORMAL JUICE.							Gallons juice per acre.	Saccharose lb. per acre.	Increase or decrease on no-phosphate.
				Sp. Gr. 80° 16.6°	Lb. per gallon of			Quotient of purity.	Glucose ratio.				
					Saccharose.	Glucose.	Solids not sugar.						
PLANTS.													
Farmyard manure 1,200 cubic feet	B. 376	Jubo's Head	29.54	1.0791	1.88	.071	.209	87.04	3.78	3,812	7,167	...	
Nitrate of potash 100 lb.	B. 376	Mill.	31.98	1.0782	1.90	.069	.171	88.78	3.63	3,163	6,910	...	
Sulphate of ammonia 200 lb.	B. 376	...	30.76	1.0787	1.89	.070	.190	87.91	3.71	3,488	6,589	+ 872	
Means ...	...	...	...	FIRST RATINGS.	...	...	...	...	...	...	...	...	
Nitrate of potash 100 lb.	B. 376	Jubo's Head	22.67	1.0809	2.03	.050	.130	91.86	2.46	2,662	5,404	...	
Sulphate of ammonia 200 lb.	B. 376	Mill.	19.58	1.0800	1.98	.068	.152	90.83	3.43	2,548	5,045	...	
Means ...	...	...	21.13	1.0805	2.01	.059	.131	91.35	2.95	2,605	5,225	- 282	
SECOND RATINGS.													
Nitrate of potash 100 lb.	B. 376	Jubo's Head	18.16	1.0888	2.15	.074	.196	88.84	3.44	2,900	6,235	...	
Sulphate of ammonia 350 lb.	B. 376	Mill.	18.14	1.0857	2.10	.048	.182	90.13	2.29	2,981	6,260	...	
Means ...	...	...	18.15	1.0873	2.13	.061	.189	89.49	2.87	2,941	6,248	+ 317	
PLANTS.													
Farmyard manure 1,200 cubic feet	B. 376	Jubo's Head	28.46	1.0791	1.88	.074	.206	87.04	3.94	3,704	6,964	...	
Nitrate of potash 100 lb.	B. 376	Mill.	22.57	1.0787	1.94	.054	.156	90.23	2.78	2,304	4,470	...	
Sulphate of ammonia 200 lb.	B. 376	...	25.52	1.0789	1.91	.064	.181	88.64	3.36	3,004	5,717	...	
Superphosphate 100 lb.	...	...	...	...	...	...	...	...	...	...	...	...	
Means ...	...	...	...	FIRST RATINGS.	...	...	...	...	...	...	...	...	
Nitrate of potash 100 lb.	B. 376	Jubo's Head	23.41	1.0817	2.02	.063	.147	90.38	3.12	2,867	5,791	...	
Sulphate of ammonia 200 lb.	B. 376	Mill.	19.77	1.0826	2.05	.057	.143	91.11	2.78	2,548	5,223	...	
Means ...	...	...	21.59	1.0822	2.04	.060	.145	90.85	2.95	2,708	5,507	...	
SECOND RATINGS.													
Nitrate of potash 100 lb.	B. 376	Jubo's Head	14.73	1.0857	2.09	.074	.166	89.70	3.54	2,341	4,893	...	
Sulphate of ammonia 350 lb.	B. 376	Mill.	19.78	1.0844	2.08	.045	.175	90.43	2.16	3,350	6,968	...	
Means ...	...	...	17.26	1.0851	2.09	.060	.171	90.07	2.85	2,846	5,931	...	

TABLE IV.

RESULTS OF EXPERIMENTS WITH "DEAD HEART" CANES, CARRIED OUT AT STIRLING AND SPENCERS PLANTATIONS 1912.

Plots.	Estates.	No. of cane.	Size of plot.	Canes, tons per acre.	NORMAL JUICE.							Gallons juice per acre.	Saccharose lb. per acre.	Increase obtained by not cutting out "Dead Heart" canes.
					Sp. Gr. $\frac{16.6}{30}$	Sacharose.	Lb. per gallon of		Quotient of purity.	Glucose ratio.				
							Glucose.	Solids not sugar.						
"Dead Hearts" cut out ...	Stirling ...	B. 6450	2 acres	31.26	...	1.98	...	...	...	...	4,063	8,045	...	
"Dead Hearts" cut out ...	Spencers ...	B. 6450	4 "	30.00	1.0787	1.73	.069	.301	82.80	3.88	4,190	7,458	...	
Means ...	...	...	...	30.63	...	1.88	...	...	...	...	4,127	7,752	...	
"Dead Hearts" not cut out ...	Stirling ...	B. 6450	2 acres	29.99	...	1.98	...	...	...	...	4,079	8,076	...	
"Dead Hearts" not cut out ...	Spencers ...	B. 6450	4 "	32.00	1.0813	1.88	.066	.274	84.68	3.51	4,334	8,051	...	
Means ...	...	...	...	31.00	...	1.93	...	...	...	...	4,207	8,064	+ 312	

As from time to time within the last few years the question of the value of the Bourbon sugar-cane as compared with the seedling sugar-canes grown in the West Indies has been raised, it may not be without interest if I give here a summary of a paper I read before the Agricultural Conference at Trinidad, on the results obtained in Barbados on certain estates during the past fourteen years, with that sugar-cane, the White Transparent, and the seedling sugar-canes B. 147 and B. 208. In the first instance these varieties were grown in the same fields at Dodds, at an elevation of 210 feet above sea level, and the average rainfall for the fourteen years was 56.39 inches. Care was taken each year to use as far as could be seen, only sound healthy cuttings obtained from plant canes, for planting the plots. In spite, however, of all the care taken to plant apparently healthy cuttings, the Bourbon has each year with one exception been more or less attacked by the fungus *Colletotrichum falcatum*, Rom.

TABLE V.

	Average yield of muscovado sugar for 14 years. lb.	Increase on Bourbon in lb. of muscovado sugar per acre.	Increase on W. Trans. in lb. of muscovado sugar per acre.	Increased yield on Bourbon per cent.	Increased yield on W. Trans. per cent.	Value of increased yield on Bourbon less the cost of manufacture.	Value of increased yield of W. Trans. less the cost of manufacture.
Bourbon ...	3,571	...	...	...	...	...	...
W. Transparent ...	4,634	1,063	...	29.8	...	\$ 22.45	...
B. 208 ...	4,936	1,365	302	38.2	6.5	\$ 28.82	\$ 6.38
R. 147 ...	5,763	2,192	1,129	61.4	24.4	\$ 46.23	\$ 23.85

Table V. gives the results obtained for the fourteen years in pounds of muscovado sugar per acre, on the assumption that every 100 lb. of saccharose in the juice was equal to 80 lb. of muscovado sugar of 89° test and its molasses. The value of these two products has been calculated at the average price at which muscovado sugar and molasses sold during those fourteen years, namely \$1.72 per 100 lb. of sugar and 13.7 cents per wine gallon of molasses, less the cost of manufacture. As will be seen from table V. during the fourteen years the sugar-cane which did best, viz. B. 147, gave sugar and molasses, after deducting the cost of manufacture, of the value of \$46.28 per annum more than the Bourbon cane; the B. 208, \$28.82 more and the White Transparent, \$22.45 more. As compared with the White Transparent which was the cane that was principally substituted for the Bourbon, when the cultivation of that cane had to be discontinued owing to the attacks of the fungus mentioned above, B. 147 yielded 24.4 per cent. more sugar, and B. 208 yielded 6.5 per cent. more.

Some of the planters in the neighbourhood of Dodds, finding from the results of the small experiment plots which they instituted on their estates with some of the better of the seedling sugar canes, that the results obtained with certain of the varieties were better than those of the White Transparent, with which they had mainly replaced the Bourbon, gradually increased the area with those that did best, until they have ceased cultivating the White Transparent. And it may not be without interest if I give the results obtained in Barbados, on a fairly large area at Carrington, an estate in the neighbourhood of Dodds, for the four years 1903-1906 inclusive, which are as follows:—

TABLE VI.

Variety of sugar-cane.	Acreage of canes reaped for the four years.	Dark crystal sugar per acre in lb.	Increase of dark crystal sugar on W. Transparent.	Value of dark crystal sugar with its molasses per acre per annum.
W. Trans. ...	396.5	5,134	...	\$102.20
B. 208 ...	23.5	5,485	351	\$109.19
B. 147 ...	125.0	5,949	815	\$118.42

The value of the sugar has been calculated at \$2.05 per 100 lb. plus 8 cents per wine gallon for the dark crystal vacuum pan molasses, less 22 cents per 100 lb. of sugar the cost of manufacture. The average quantity of molasses obtained at Carrington is about 45 wine gallons per ton of all sugars.

On the assumption that had the Bourbon been grown at Carrington during the four years, and that the yield had been in the same ratio as the yield at Dodds, the yield of the Bourbon would have been 3,956 lb. of dark crystal sugar, and the value with its molasses at the above prices, would have been \$78.75 per acre per annum.

For the four years therefore the value of the increased yield per acre per annum of the White Transparent, the B. 208 and the B.147 over the Bourbon would have been \$23.45, \$30.44 and \$39.67 respectively.

The average results obtained at Dodds and Carrington estates are briefly as follows:—

TABLE VII.

Variety of sugar cane.	Dodds increase on Bourbon.	Carrington estate increase on Bourbon.	Average.
W. Trans. ...	\$22.45	\$23.46	\$22.95
B. 208 ...	\$28.82	\$30.44	\$29.63
B. 147 ...	\$46.28	\$39.68	\$42.98

From table VII it will be seen that the average revenue per acre of B. 147 over the Bourbon cane at the two estates based on the ratio of the Bourbon to the White Transparent at Dodds was \$42.98 (£8 19s. 1d.), of the B. 208 over the Bourbon \$29.63 (£6. 3s. 5½d.) and of the White Transparent over the Bourbon \$22.95 (£4 15s. 7½d.). It will also be seen that the average revenue per annum of the B. 147 and B. 208 over

the White Transparent was \$20.03 (£4 3. 5½d.) and \$6.68 (£1 7s. 10d.) respectively. I need hardly add that the White Transparent is now not grown at Carrington and certain other of the neighbouring estates on which the sugar-canes are weighed and the juice analysed. It is but fair however to add, that owing to the B.147 proving a poor ratooning cane in Barbados, it is not a suitable sugar-cane for the whole island. It is probable that its place will be taken by B. 6450, a sugar-cane which has given exceptionally good results as plant canes in the black soil districts, and as plant and ratoon canes in the red soil districts.

It may be mentioned incidentally that during the last ten years several of the planters have endeavoured to grow the Bourbon sugar-cane in Barbados, but in every instance, so far as I know, it has been attacked by the fungus *Colletotrichum falcatum*. Recently, there were two plots of Bourbon sugar-canes growing on one estate from plants obtained from Panama, and for a long time they were free from disease, but before they reached maturity this fungus was found to be present.

Owing to the fact that sometimes there is a delay of more than one day after sugar-canes are cut before they are supplied to the central sugar factories it has been considered advisable, owing to the number of these recently established, to ascertain the loss that accrues from the delay. With this object in view a quantity of B. 376 canes were cut at Summervale, thoroughly mixed and made into sixty bundles of 105 lb. each, and sent to the Government Laboratory where each bundle was made exactly 100 lb. These bundles were then forwarded to the Department of Agriculture and divided into three series of twenty bundles each, which were designated A, B & C. The A series were left exposed to the sun and air as they would be under ordinary plantation conditions. The B series were covered with the fallen dry leaves of the sugar-cane. The C series were covered with dry leaves of the sugar-cane and watered once daily. Each day for some days a bundle of each series was crushed and the juice analysed. The results will be given in full in the report of the sugar-cane experiments, but it may be briefly mentioned here, that for the first three days little change took place; after that time however, they rapidly deteriorated.

In my annual report for 1908-9, I mentioned that I had evolved a method after some difficulty, whereby sugar-canes could be sent practically all over the world in good condition, by packing them in damp powdered charcoal. The difficulty was to use just the right quantity of water; if too much water is used the sugar-canes grow too much in the case, if too little, the moisture is extracted from the canes and they shrivel and die. That this method still continues to give satisfactory results, may be gathered from the following extract of a letter received from Mr. F. Vandesmet of Atalaia-Maceio, Brazil.

"Towards the close of July the case containing your shipment of B. 3,859 and B. 6,835 came to hand, and on the 26th of July I planted them out. At this date August 13, these plants have been in the ground 18 days, and the twelve plants of B. 3859 are all growing, and six of the B. 6835 are also growing. The plants arrived in good condition and I have not the slightest doubt that the six others of B. 6835 will also grow. By reckoning from the date they were packed, by your letter of March 13, 1911, advising their despatch, to the date they were planted, viz:—July 26, 1911, we find that they have been on the voyage for 136 days. And the fact of their having arrived in such excellent condition and growing normally, after having travelled such a distance is evidently due to the excellence of your packing. It is a pleasure and a duty to me to congratulate you heartily.

"This case which was shipped at Barbados on the Lloyd Brasileiro steamer 'Rio de Janeiro' had been forgotten in a room for small packages, was not landed at Pernambuco on its arrival to this port and was carried to Rio de Janeiro, where it was not discovered. This same steamer returned to New York with the case on board and it was on its return from New York that it was at last found, and landed at its port of destination, Pernambuco, after having been carried the following places—Barbados to Rio de Janeiro—Rio de Janeiro to New York—New York to Pernambuco."

THE COTTON INDUSTRY.

The cotton experiments for improving the quality and increasing the quantity of lint from the Sea Island cotton grown in Barbados were continued. These experiments are carried on in two series. In the first series an effort is being made by a system of selection of the best formed plants giving heavy yields of good lint to improve the Sea Island, certain indigenous and other varieties of cotton. In the second series of the experiments an effort is being made in the same manner to improve a number of hybrid cottons that have been obtained by crossing some of the best of the imported varieties with some of the indigenous cottons. In these experiments a certain number of the plants which are healthy, vigorous and cone-shaped, from 4 to 6 feet high, compact in habit, with the central stalk, having numerous lateral branches, short internodes and bolls at almost each internode are marked with a piece of red braid, and a stake is placed against each selected plant, so that it can easily be seen from a distance and readily found. As the flowers are sufficiently matured, a number are bagged to prevent cross-fertilization. As soon as the corolla and anthers are dried, the bag is removed and a numbered metal label

attached. At the same time, a portion of one bract is cut off so that it can be easily seen to which boll the label belongs. During the growth of the marked plants, notes are made as to their immunity or otherwise to insect pests, fungoid and bacterial diseases, and also to their habit, maturity, etc. When the plants, the flowers of which have been bagged to prevent cross-fertilization, are reaching maturity they are examined, and if it is found that such plants are to any extent attacked by insect pests, fungoid or bacterial diseases they are discarded. As soon as the bolls open, the lint is examined and if it is found that it is not up to standard, such plants are also rejected. On the other hand, as the bolls, the flowers of which were bagged, open and the cotton is found to be of good quality, it is picked as fast as it reaches maturity, and put into a small bag which is kept in a large bag that has been numbered to correspond to the numbered label that has been attached to the plant. As the cotton produced by the bolls from the non-bagged flowers ripen, it is gathered and put into the larger bag. As soon as the plants cease bearing, the seed cotton from each plant is weighed and the lint from the bolls, the flowers of which were self-fertilized, is carefully examined as to the characters which go to make up the best quality lint. To these various characters numbers are assigned and the seed from the plants that obtained the highest number of marks is reserved for planting on the experiment plots the following year. In future, if it is desired to extend the cultivation of any special variety, the seeds from the bolls, the flowers of which were not bagged, will, if needed, now that some of the varieties have been greatly improved be used for extending the cultivation of that variety. If any plant is found not true to type it will be rogued out. The following is a scale of these marks which is tentative, and may be changed later on if found necessary; but so far the results of the marking, tested by the report of Mr. C. M. Wolstenholme, of the firm of Messrs. Wolstenholme and Holland, Cotton Brokers of Liverpool, who has been good enough to examine the cotton, appear to be satisfactory, as almost in every instance Mr. Wolstenholme's report has confirmed the opinion formed of the sample as indicated by the results of the marking on the examination.

SCORE FOR SEED COTTON SELECTION PLOTS.

PLANT				
Habit:				
Upright <i>v.</i> recumbent	...	...	...	2
Compact <i>v.</i> straggling	...	...	...	2
Strong central stalk, with numerous lateral branches starting from the bottom of the plant, short internodes and regularity of bolling	...	...	...	10
Well filled bolls, long and pointed	...	...	...	2
Number of locks, if four	...	...	...	2
Maturity	...	...	...	2
Resistance to insect pests and fungoid diseases:				—
Insect pests	...	...	...	15
Fungoid diseases	...	...	...	15
Productivity:				—
Yield from plant, 100 grms. to 600 grms.	...	...	...	50
				100

MARKING OF COTTON AFTER EXAMINATION.

Ten seeds are examined for each sample: these are if necessary done in duplicate, triplicate, etc.

Length of fibre:—				
45 mm. to 60 mm.	...	15	1	mark for each mm. 15
Distribution of lint on seed:—				
Very uniform (V.u.)	...	10	1	mark for each seed 10
Uniform (U.)	...	5	·5	" " " "
Fairly uniform (F.u.)	...	2·5	·25	" " " "
Regularity of length:—				
Very regular (V.r.)	...	5	·5	" " " "
Regular (R.)	...	2·5	·25	" " " "
Fairly regular (F.r.)	...	1·25	·125	" " " "
Proportion of weak fibre:—				
15 per cent. to 35 per cent.	20 marks	for 20 per cent.	or 1 mark for	
each per cent.	...	...	...	20
Proportion of lint to seed:—				
22 per cent. to 34 per cent.	= 12 per cent.	for 6 marks	= ·5 for each	
per cent.	...	...	...	6
Fineness:—				
·0120 to ·0180 mm.	10 marks	...	...	10
Factor 1667. Multiply the difference between ·0120 and ·0180 by 1667 and subtract from 10.				

Silkiness :—

Very silky (V.s.)	...	4	·4	mark	for each seed	4
Silky (S.)	...	2	·2	"	" " " "	
Fairly silky (F.s.)	...	1	·1	"	" " " "	

Strength :—

Very strong (V.st.)	...	30	3	"	" " " "	30
Strong (St.)	...	15	1·5	"	" " " "	
Fairly strong (F.st.)	...	7·5	·75	"	" " " "	

100

The experiments in the first series, of which there were sixteen, were carried out on land rented from Waterford plantation and with the co-operation of the undermentioned planters on the following estates :—

Name of Estate.	Parish.	Proprietor or Attorney.	Manager.
Stirling	St. Philip	Dr. C. E. Gooding, M.C.P.	A. R. Hunte.
Dodds	"	Governor-in-Executive Committee	W. C. Smith.
Sandford	"	Hon. G. A. Goodman, K.C., M.C.P.	E. Wood.
Woodland	St. George	G. A. Sealy	G. E. Sealy, M.C.P.
Chancery Lane	Ch. Church	H. G. Yearwood, M.C.P.	W. H. Yearwood
Coverley	"	Hon. Sir F. J. Clarke, K.C.M.G., B.A., M.C.P.	Hon. Sir F. J. Clarke &c.
Fairy Valley	"	H. G. Yearwood, M.C.P.	W. H. Yearwood

Experiments with hybrids were also carried on with the co-operation of the planters on the following estates : viz. Coverley, Fairy Valley, Mount Pleasant, Sandford, Upton and Woodland.

Tables Nos. VIII. to XIII. give the results of the cotton from these plots, and Mr. Wolstenholme's report on the samples. To obtain some idea of the value of each variety as a crop producer, the quantity obtained from the plant is calculated to the acre. At the time the cotton was being examined in England the price of West Indian Sea Island cotton was about 17-19d. per lb. One sample, Heaton, as will be seen from the table, was valued at 18-19d. per lb., and Mr. Wolstenholme said it was remarkably strong. Waterford, a variety obtained from a plant growing in a field of cotton on that estate, which was comparatively healthy and vigorous, while the remaining plants were badly attacked by fungoid diseases and insect pests, and were, in some instances dying, was also valued at from 18-19d. per lb. Grant, the indigenous variety which has improved so much under the selection carried on, was valued at 16-17d. per lb. The variety of "Silket" at Chancery Lane was also reported on favourably being valued at 18d. per lb.

TABLE VIII.
REPORT ON THE EXAMINATION OF COTTON FROM THE SELECTION EXPERIMENT PLOTS OF THE LOCAL
DEPARTMENT OF AGRICULTURE, BARBADOS, 1911.

Name or No. of plant.	Description of plant, habit, height, &c.	Resistance to insect pests.	Resistance to fungoid diseases.	Lint per acre, lb.	Average length of staple, mm.	Weak fibres per cent.	Proport. lint to seed per cent.	Average diameter of fibre.	Strength.
Stirling S. 1 ..	Upright; 4' high; small stalk; 2 large, several small basal laterals; large, long pointed bolls; distribution general ...	Aphis slightly ...	Angular leaf-spot slightly ...	693	43.5	18.6	25.6	.0163	Str.
Stirling S. 11 ..	Slightly reclining; 4' 6" high; small stalk; 2 large, several small basal laterals; large, long pointed bolls; distribution general ...	Free ...	Angular leaf-spot slightly ...	555	43.8	19.4	25.7	.0160	Str.
Silkot 33 ..	Slightly reclining; 6' high; large stalk; 4 large, several small basal laterals; medium size, pointed bolls; distribution general ...	Free ...	Angular leaf-spot slightly ...	212	40.2	20.0	18.6	.0162	Str.
Silkot 37 ..	Upright; 6' 6" high; medium size stalk; 2 large, several small basal laterals; small pointed bolls; distribution general...	Free ...	Angular leaf-spot slightly ...	269	43.1	18.6	22.8	.0160	Str.
Silkot 38 ..	Reclining; 5' 6" high; medium size stalk; 2 large, several small basal laterals; small round bolls; distribution general	Free ...	Angular leaf-spot slightly ...	292	42.6	19.4	26.0	.0167	F. str.
Florida ..	Slightly reclining; 5' high; small stalk; 3 large basal laterals; medium size pointed bolls; distribution general ...	Aphis slightly ...	Angular leaf-spot slightly ...	491	43.0	18.8	28.4	.0157	Str.
Waterford ..	Slightly reclining; 5' high; small stalk; 4 large basal laterals; medium size pointed bolls; distribution general ...	Free ...	Angular leaf-spot very slight.	513	44.9	18.4	25.8	.0155	Str.

TABLE VIII. (Continued.)
REPORT ON THE EXAMINATION OF COTTON FROM THE SELECTION EXPERIMENT PLOTS OF THE LOCAL DEPARTMENT
OF AGRICULTURE, BARBADOS, 1911.

Name or No. of plant.	Description of plant, habit, height, etc.	Resistance to insect pests.	Resistance to fungoid diseases.	Lint per acre lb.	Average length of staple, mm.	Weak fibre per cent.	Proportion lint to seed per cent.	Average diameter of fibre.	Strength.
Husbands	... Slightly reclining; 5' high; small stalk; 4 large basal laterals; medium size, long and pointed bolls; distribution general ...	Free	Angular slightly ...	384	45.2	18.8	24.7	.0165	Str.
Grant	... Upright; 6' high; large stalk; 4 large, several small basal laterals; medium size pointed bolls; distribution general ...	Free	Angular slightly ...	1,211	46.2	14.4	27.5	.0162	Str.
Antigua	... Upright; 4' 6" high; small stalk; 2 large, few small basal laterals; long pointed bolls; distribution general ...	Free	Angular slightly ...	424	44.2	18.9	22.3	.0158	Str.
Hy. Gilkes	... Slightly reclining; 4' 6" high; small stalk; 3 large basal laterals; long pointed bolls; distribution general ...	Free	Angular leaf-spot very slight ...	489	45.1	20.0	29.3	.0161	Str.
Bathsheba	... Upright; 6' 6" high; medium size stalk; 5 large, several small basal laterals; small pointed bolls; distribution general ...	Free	Angular leaf-spot slightly; round spot slightly ...	626	40.2	23.1	23.9	.0161	Str.
Thornhill	... Slightly reclining; 5' 6" high; small stalk; 3 large basal laterals; medium size long pointed bolls; distribution general ...	Free	Angular leaf-spot slightly ...	399	45.8	21.1	27.2	.0163	Str.
Carrington	... Upright; 5' high; medium size stalk; 3 large basal laterals; medium size long pointed bolls; distribution general ...	Free	Angular leaf-spot slightly ...	360	45.1	18.3	29.1	.0158	Str.

TABLE VIII.—*Concluded.*

REPORT ON THE EXAMINATION OF COTTON FROM THE SELECTION EXPERIMENT PLOTS OF THE LOCAL
DEPARTMENT OF AGRICULTURE, BARBADOS, 1911.

Name or No. of plant.	Description of plant, habit, height, &c.	Resistance to insect pests.	Resistance to fungoid diseases.	Lint per acre lb.	Average length of staple, mm.	Weak fibre per cent.	Proportion lint to seed per cent.	Average diameter of fibre.	Strength.
Heaton ...	Upright; 5' 6" high; small stalk; 2 large, several small basal lateralis; medium size long pointed bolls; distribution general	Free.	Angular leaf-spot slightly.	428	43.0	18.8	25.7	.0161	Str.
C. 106 ...	Upright; 4' 6" high; small stalk; 3 large, several small basal lateralis; medium size, long, pointed bolls; distribution general	Free.	Angular leaf-spot very slight.	32.7	44.0	14.1	25.4	.0160	V. str.

TABLE IX.
 REPORT ON THE EXAMINATION OF SEA ISLAND COTTON FROM THE CO-OPERATIVE EXPERIMENT PLOTS, BARBADOS,
 GROWN DURING THE COTTON SEASON 1910—1911.

Name or No. of plant.	Description of plant, habit, height, &c.	Insect pests.	Fungoid and bacterial diseases.	Lint per acre lb.	Average length of staple, mm.	Weak fibres, per cent.	Proportion lint to seed per cent.	Average diameter of fibre.	Strength.
Sandford	Upright 5' high, small stalk, 1 large and a few small basal laterals; long well-filled bolls; distribution general	Free	Angular leaf-spot slightly	137	47.3	20.0	25.0	.0160	Str.
Stirling S.	Upright; 4' 6" high, small stalk, 3 large basal laterals; large well-filled long pointed bolls; distribution general	<i>Saissetia nigra</i> slight	Angular leaf-spot slightly	369	50.3	21.4	25.2	.0160	F. str.
Stirling U.	Upright; 4' 6" high, small stalk; 2 large basal laterals; medium size long pointed bolls; distribution general	Free	Angular leaf-spot slightly	198	48.5	20.4	20.6	.0155	Str.
Dodds No. 5	Slightly reclining; 4' 6" high; small stalk; several small basal laterals; long pointed bolls; distribution general	Free	Angular leaf-spot slightly	194	44.1	17.0	26.3	.0159	Str.
Chanery Lane	Upright; 5' 6" high, medium size stalk; 2 large, several small basal laterals; large, long and pointed bolls; distribution general	Free	Mildew bad	312	44.8	17.1	32.3	.0159	Str.

TABLE X.
RETURN OF THE EXAMINATION OF "SILKET" COTTON FROM THE CO-OPERATIVE EXPERIMENT PLOTS, BARBADOS
GROWN DURING THE COTTON SEASON 1910-1911.

Name or No. of plant.	Description of plant, habit, height, &c.	Insect pests.	Fungoid and bacterial diseases.	Lint per acre, lb.	Average length of staple mm.	Weal fibres, per cent.	Proport lint to seed, per cent.	Average diameter of fibre.	Strength.
Woodland Silket 340	Upright, 5' 6" high, medium size stalk; 4 large, several small basal laterals; medium size long pointed bolls; distribution general	Free	Angular leaf-spot	531	45.8	15.1	24.5	.0158	Str.
Carrington Silket 33	Recumbent, 6' high, medium size stalk, 4 large basal laterals; large long pointed bolls; distribution general	Free	Free	782	41.0	18.1	26.1	.0146	F. str.
Carrington Silket 35	Reclining, 6' high, medium size stalk, 2 large, several small basal laterals; large long and pointed bolls, distribution general	Free	Free	544	41.8	18.5	25.0	.0146	F. str.
Fairy Valley Silket 122 ...	Upright, 6' 6" high, large stalk, 3 large basal laterals, medium size well filled bolls, distribution general	Free	Angular leaf-spot very slightly	454	45.2	19.1	30.7	.0158	Str.
Fairy Valley Silket 124 ...	Slightly reclining, 6' 6" high, large stalk, 2 large, several small basal laterals; long bolls; distribution general	Free	Mildew bad	624	40.1	21.7	24.4	.0165	Str.
Fairy Valley "Upton" Silket 51 ...	Reclining, 7' high, large stalk, 3 large, several small, basal laterals; small long pointed bolls; distribution general	Free	Angular leaf-spot	1,815	35.9	21.2	29.1	.0161	F. str.
Chancery Lane Silket	Upright, 6' high, medium size stalk, 2 large several small basal laterals; medium size long bolls; distribution general	Free	Angular leaf-spot very slightly	312	41.0	15.8	28.2	.0155	Str.

TABLE XI.

REPORT AND VALUATION OF COTTON FROM THE SELECTION PLOTS OF
THE LOCAL DEPARTMENT OF AGRICULTURE, BARBADOS, GROWN
DURING THE COTTON SEASON 1910-1911.

by Mr. C. M. WOLSTENHOLME.

Name of cotton.	Classification and report.	Strength.	Value per lb.
Stirling S. 1 ...	Bright, moderately fine, fair length ...	Strong ...	17d.
Stirling S. 11 ...	Very bright, staple fine, regular ...	Strong ...	18-19d.
Silket 33 ...	Bright, staple inclined to be short, fine rather soft ...	Not strong	14-15d.
Silket 37 ...	Rather dull, moderately fine, fairly regular ...	Fairly strong	16-17d.
Silket 38 ...	Dull, staple rather coarse and irregular ...	Rather weak	13d.
Florida ...	Fairly bright, staple moderate length, fairly fine ...	Fairly strong	14d.
Waterford ...	Bright, fair length and regular, fairly fine ...	Strong ...	18-19d.
Husbands ...	Fairly bright, short wanting in fineness ...	Moderately strong ...	13d.
Grant ...	Fairly bright, moderate length, rather irregular, wanting in fineness ...	Fairly strong	16-17d.
Antigua ...	Dull, short in staple, rather wanting in fineness ...	Not very strong ...	14d.
Hy. Gilkes ...	Bright, short in staple, rather coarse ...	Fairly strong	14d.
Bathsheba ...	Bright, rather short and wanting in fineness, irregular ...	Fairly strong	14d.
Thornhill ...	Bright, fair length, fine ...	Rather weak	15d.
Carrington ...	Moderately bright, fair length wanting in fineness ...	Fairly strong	15d.
Heaton ...	Bright, close and regular, fairly fine ...	Very strong	18-19d.
C. 106 ...	Very bright, moderately fine, moderate length, regular ...	Fairly strong	16-17d.

TABLE XII.

REPORT AND VALUATION OF SEA ISLAND COTTON FROM
CO-OPERATIVE EXPERIMENT PLOTS, BARBADOS, GROWN
DURING THE COTTON SEASON 1910-1911,

by MR. C. M. WOLSTENHOLME.

Name of cotton.	Classification and report.	Strength.	Value per lb.
Sandford	Bright, fine, good length.	Fairly strong.	17-18d.
Dodds No. 5. ...	Rather dull, moderate length, moderately fine.	Strong.	15-16d.
Stirling U. ...	Very bright, moderately fine, good length.	Fairly strong.	18d.
Stirling S. ...	Bright, fine, good length.	Very strong.	19d.
Stirling (a) Hybrid No. 1 ...	Creamy in colour, moderate length, rather wanting in fineness.	Fairly strong.	13-14d.
Stirling (a) Hybrid No. 2 ...	Very bright, staple rather wasty and irregular, moderate length.	Wanting in strength.	16d.
Chancery Lane ...	Very bright, staple fine and long.	Fairly strong.	18d.

(a) Samples sent in by Dr. C. E. Gooding from Stirling Plantation.

TABLE XIII.

REPORT AND VALUATION OF "SILKET" COTTON FROM CO-OPERATIVE
EXPERIMENT PLOTS, BARBADOS, GROWN DURING THE
COTTON SEASON 1910-1911,

by MR. C. M. WOLSTENHOLME.

Name of cotton.	Classification and report.	Strength.	Value per lb.
Woodland Silket 340	Rather dull, staple fine, fair length, little irregular	Fairly strong	17d.
Fairy Valley Silket No. 122 ...	Creamy colour, wanting in fineness, moderate length	Fairly strong	17d.
Fairy Valley Silket No. 124 ..	Bright, staple moderately fine, rather short and wasty	Fairly strong	15-16d.
Fairy Valley "Upton" Silket 51 ...	Bright, staple moderately fine	Strong ...	8-8½d.
Carrington Silket No. 33	High colour, very wasty, rather fine	Weak ..	12d.
Carrington Silket No. 35	Dull, rather short, irregular and wasty, wanting in fineness	Rather weak	12d.
Chancery Lane Silket E. 44	Bright, staple rather coarse and irregular, Florida length	Strong ...	14d.

These experiments, except where the variety has been discarded for any special reason, have been continued, and samples of the cotton will in due course be submitted to Mr. Wolstenholme, who will be asked to be so good as to report on them.

COTTON HYBRIDS.

In the second series of experiments, the hybrid cottons were re-grown from seeds of the best plants obtained the previous year. No new hybrids were produced this year as owing to the number of cotton experiments that are now being carried on, it is impossible to deal with a larger number than there are now under experimental cultivation.

In last year's report I mentioned that the results obtained with the hybrids of the second year were most interesting and confirmed the results obtained by Mr. O. F. Cook, of the Bureau of Plant Industry of the United States Department of Agriculture, who in his bulletin on "Suppressed and Intensified Characters in Cotton Hybrids" says, "Hybrids produced from two different types of cotton show a wide range of diversity, wider than that of either of the parent stocks. Some of the characteristics of the parent stocks may re-appear in the hybrids without any notable change. In other respects the hybrids may be intermediate between the parents, or they may exceed both parents, or they may be more deficient than either parent, and that finally, hybrids often show characters which the parental types are not known to possess." Similar results have been obtained with the experiments carried on on the land rented from Waterford plantation; but it is only what one may expect when it is realised that the parents of the hybrids are not pure strains. However, by carefully selecting the best plants each year it is hoped that a variety will be obtained capable of producing heavy yields of good quality cotton. The results are given in tables XIV to XVI.

TABLE XIV.

TABLE SHOWING THE CHARACTER, FREEDOM FROM DISEASE, YIELD, &c., OF THE COTTON HYBRIDS OBTAINED IN 1909.

Name or No. of plant.	Generation.	Year.	Insect pests.	Fungoid and bacterial diseases.	Seed cotton per plant, lb.	Seed cotton per acre, lb.	Lint per acre, lb.	Length of lint, mm.	Per cent. weak fibre.	Per cent. lint.	Strength.
H. 0916 ..	F ₁	1910	Free.	Black-arm and angular leaf-spot slightly.	·45	(a) 1,944	502	49·7	20·5	25·8	Str.
H. 0916 ..	F ₂	1911	Free.	Angular leaf-spot slightly.	1·55	(b) 2,232	629	43·5	16·5	28·2	Str.
H. 0916 ..	F ₃	1912	Aphis and cotton caterpillar (d)	Angular leaf-spot slightly.	·70	(c) 2,016	540	40·7	19·7	27·0	F. str.
H. 0944 ..	F ₁	1910	Free.	Angular leaf-spot slightly.	·67	(a) 2,894	645	48·8	20·2	22·3	Str.
H. 0944 ..	F ₂	1911	Free.	Angular leaf-spot slightly.	1·81	(b) 2,606	584	44·9	24·8	22·4	Str.
H. 0944 ..	F ₃	1912	Aphis and cotton caterpillar (d)	Angular leaf-spot slightly, round-spot slightly.	1·43	(c) 4,118	944	38·9	18·5	22·8	Str.
H. 0963 ..	F ₁	1910	Free.	Angular leaf-spot badly.	·32	(a) 1,382	427	44·4	18·0	30·9	F. str.
H. 0963 ..	F ₂	1911	Aphis slightly.	Angular leaf-spot slightly.	·60	(b) 864	246	45·4	21·3	28·5	Str.
H. 0963 ..	F ₃	1912	Aphis and cotton caterpillar moderately (d)	Angular leaf-spot and rust slightly.	1·23	(c) 3,542	1,080	43·3	22·1	30·0	Str.

TABLE XIV.--(Concluded.)

TABLE SHOWING THE CHARACTER, FREEDOM FROM DISEASE, YIELD, &c., OF THE COTTON HYBRIDS OBTAINED IN 1909.

Name or No. of plant.	Generation.	Year.	Insect pests.	Fungoid and bacterial diseases.	Seed cotton per plant, lb.	Seed cotton per acre, lb.	Lint per acre, lb.	Length of lint, min.	Per cent. weak fibre.	Per cent. lint.	Strength.
H. 0954 ..	F ₁	1910	Free.	Angular leaf-spot badly	.37	(a) 1,598	443	44.6	17.2	27.7	Str.
H. 0954 ..	F ₂	1911	Free.	Angular leaf-spot slightly	.70	(b) 1,008	268	42.3	19.4	26.6	F. str.
H. 0954 ..	F ₃	1912	Aphis and cotton cat- erpillar moderately (d)	Angular leaf-spot moderately	.96	(c) 2,765	765	43.1	19.4	27.6	Str.
H. 0966 ..	F ₁	1910	Aphis very slight	Black-arm badly	.25	(a) 1,080	303	44.1	21.2	28.1	F. str.
H. 0966 ..	F ₂	1911	Aphis slightly	Angular leaf-spot slightly	.69	(b) 994	234	39.2	18.6	23.5	F. str.
H. 0966 ..	F ₃	1912	Aphis slightly, cotton caterpillar, (d)	Angular leaf-spot very slightly	.78	(c) 2,246	585	45.0	23.1	25.9	Str.
D. H. 28 (e)	...	1910	<i>Scissotia nigra</i>	Anthraxnose slightly	1.25	...	...	38.9	45.3	46.0	Str.
D. H. 28 (e)	...	1911	Free	Angular leaf-spot slightly	.26	(c) 749	209	44.5	18.8	27.3	Str.
D. H. 28 (e)	...	1912	Aphis slightly	Angular leaf-spot slightly; round-spot slightly	.34	(c) 979	245	43.6	20.9	25.1	F. str.

(a) Planted in rows 5½ feet apart and 22 inches apart in the rows.

(b) Planted in rows 5½ feet apart and 5½ feet apart in rows.

(c) Planted in rows 5½ feet apart and 33 inches apart in the rows.

(d) *Atabama argillacea* Hubn.

(e) Sent from Dennera by Mr. Stockdale.

TABLE XV.

TABLE SHOWING THE CHARACTER, FREEDOM FROM DISEASE, YIELD, &c., OF THE COTTON HYBRIDS OBTAINED IN 1910.

Name or No. of plant.	Year.	Insect pests.	Fungoid and bacterial diseases.	Seed cotton per plant, lb.	Seed cotton per acre, lb.	Lint per acre, lb.	Length of lint, mm.	Per cent. weak fibre.	Per cent. lint.	Strength.
H. 101 Grant x Stirling S. 11 ...	1911	Free ...	Angular leaf-spot slightly ...	1.15	3,312	877	46.3	25.5	26.3	Str.
H. 101 Grant x Stirling S. 11 ..	1912	Aphis slightly, cotton caterpillar moderately, (d).	Angular leaf-spot slightly ; round spot slightly ...	.95	2,736	697	42.8	22.0	25.4	F. str.
H. 103 Bathsheba x Stirling S. 11 ...	1911	Free ...	Angular leaf-spot slightly ...	.47	1,354	315	45.4	23.2	22.9	Str.
H. 103 Bathsheba x Stirling S. 11 ...	1912	Aphis slightly, cotton caterpillar moderately, (d).	Angular leaf-spot slightly ...	1.01	2,909	877	41.6	24.4	30.2	F. str.
H. 105 Stirling S. 11 x Bathsheba ...	1911	Aphis slightly ...	Angular leaf-spot slightly ...	.63	1,814	517	45.9	18.3	28.4	Str.
H. 105 Stirling S. 11 x Bathsheba ...	1912	Aphis slightly, cotton caterpillar moderately, (d).	Angular leaf-spot slightly ; round spot slightly ...	.59	1,699	472	44.3	23.5	27.6	Str.

(d) *Alabama argillacea* Hubn.

TABLE XVI.

REPORT AND VALUATION OF COTTON FROM THE HYBRID SELECTION
PLOTS OF THE LOCAL DEPARTMENT OF AGRICULTURE
GROWN DURING THE COTTON SEASON 1910—1911,
by MR. C. M. WOLSTENHOLME.

Name of cotton.	Classification and report.	Strength.	Value per lb.
H. 0944a	Dull, staple moderately fine, fair length, little irregular.	Fairly strong	15—15½d.
H. 0966	Dull, high colour, staple short and soft.	Rather weak.	11—12d.
H. 0954	Bright, moderate length, fairly fine.	Moderately strong.	15—16d.
H. 0963	Very bright, regular, good length, rather wanting in fineness.	Fairly strong	17d.
D.H. 28	Bright, rather wanting in length and fineness.	Moderately strong.	15d.
H. 101	Fairly bright, close, moderate length, fairly fine.	Strong.	17—18d.
H. 102	Rather dull, staple short, rather irregular and wasty.	Moderately strong.	14—15d.
H. 103	Fairly bright, rather short, wanting in fineness.	Moderately strong.	15d.
H. 105	Bright, wanting in fineness and length.	Moderately strong.	15—16d.

As will be seen from the tables Nos. XIV to XVI showing the character, freedom from disease, yield, etc., of the cotton hybrids obtained in 1909, for the three years 1910-1912, some of the varieties have slightly declined in length, while others on the other hand have produced cotton of greater length. With regard to the productivity of some of the varieties, some have given greater yields than before and others less. These results, as was pointed out last year, appear to be somewhat similar to the results obtained in the cotton experiments carried on by the Department of Agriculture of the United States of America, where it was found that in crosses obtained with Egyptian cotton and the United States Upland cotton, the lint was inferior to that of the parent stocks, at least in the earlier generations, but in the third generation individual plants showed marked improvement, proving that the long lint character had only been suppressed and not lost altogether. It will be interesting to watch these experiments as they go on so as to ascertain what results are likely to be obtained here in the future by the production of hybrid varieties.

Although it is too soon yet since the hybrids were obtained to make any very definite statement beyond what has been written above, interesting results still continue to be obtained with the indigenous variety Grant which appears on the whole to be improving. This is particularly so with regard to the yield per plant which has steadily increased during the time it has been under cultivation and is the more noticeable as the yield of cotton for the whole island was, during the past season, the lowest since the resuscitation of the industry. It may be here mentioned that with the permission of His Excellency the Governor-in-Executive Committee, and with the assistance of Dr. C. E. Gooding of Stirling plantation, the cultivation of the Grant indigenous variety is being extended for the purpose not only of future selection, but for producing seeds for distribution in the coming year.

Table XVII shows the results obtained during the past four years with Sea Island, indigenous and other varieties cultivated during that time.

That the improvement of indigenous cottons is probably the best line of work to undertake at the present time, may be gathered from the following extract of the "Memoirs of the Department of Agriculture in India, January 1912," viz:—

From very early times repeated efforts have been made to acclimatise various exotic cottons in India. In 1829 a farm was started at Akra for the purpose for which seed was obtained from America, though even before this date importations of seed had been made. The only trace now to be found of the labour of generations in Northern India is in stray plants and, here and there, a stray field of the American type, the latter either the result of the most recent efforts of the Department or of the enterprise of individual landholders. In the rest of India the result is hardly different, and though in certain areas, as Dharwar, the type has become permanently established, it may be said in general terms that the record of acclimatization is one of failure. That such failure is due to imperfect cultivation may, in part, be true, but it is improbable that this is more than an indirect cause. It is only necessary to consider the early history of such importations to see that, for a short period, the crop is grown successfully and yields freely, and that sanguine hopes are built on the early years of experiment. It is impossible to read accounts of the earlier importations, such as are contained in Royle's Cotton Culture, in the Reports of the Cotton Commissioner and in the Journal of the Agri-Horticultural Society of India without being struck by this fact. The crop at first maintains its standard and subsequently undergoes a more or less rapid degeneration. The similarity between this and the cases of 'degeneration' in wheat is striking, and suggests the possibility of a like cause here.

The American forms of cotton in commerce have been raised to a large extent by selection. By such process the general standard in productivity, in length of lint, or in other desirable characters is raised to a high level, but the less desirable types are not completely eliminated. The improved plant is adapted to the conditions of the American cotton field with its highly developed system of cultivation, and may perhaps of itself be able to maintain its dominant position in the mixture of which the crop in reality consists. Frequently, however, this is not the case, and even in its country of origin the dominant position is only maintained by a continuous system of roguing. Such a commercial variety is in the optimum condition to exhibit this phenomenon of 'degeneration' when grown under changed conditions, and when these conditions include, in addition to climatic differences, a less careful cultivation and cessation of the process of roguing, it is hardly a matter for surprise that some of the hardier forms contained in the mixture should assert themselves to the partial or complete exclusion of the finer ones.

The process of acclimatization has consequently been marked in most, if not in all, cases by a deterioration of the produce which has been in many cases attributed to a degeneration of the race, but it is more probably simply the self-assertion of those impurities which are best suited to the new environment. The problem of the introduction of exotic races, consequently assumes a new aspect. Viewed in this light, the larger the original importation of seed, the less would appear to be the chance of successful introduction owing to the greater difficulty in the control of this process of displacement of one form by another. If acclimatization on a practical basis be possible, it requires, for the development of the conditions most favourable to success, to be carried out in a manner which admits of the detailed work involved in the extraction, testing and multiplication, of the better components as a single plant, or, at least, pure cultures. For this purpose a comparatively small importation and a comparatively small area is all that is at first necessary. Whether under such conditions, it is possible to raise a race of exotic cotton suited to the conditions of Northern India can only be tested by experiment for on this matter the evidence afforded by the past lack of success is irrelevant. It is not desired here to re-awaken hopes which have so frequently been raised in the past only to lead to disappointment; there is sufficient scope for the improvement of the races of the truly Indian cottons to render this the most promising line of work as far as Northern India is concerned. If, however, the causes for lack of success in the past are those here indicated, it follows that the possibility, or the reverse, of acclimatizing such forms as the higher grades of American or Egyptian cottons remains yet to be proved.

The conclusions arrived at above are, I understand, to a great extent also the conclusions of a scientific gentleman who was connected with agriculture in India for many years, viz., that it is highly important that the best of the indigenous varieties of cotton of any country should be improved by selection. I may here mention that I have recently obtained 131 samples of what are indigenous or acclimatized cottons, which are being cultivated for the purpose of obtaining the best of the varieties, and then by improving these to try and produce types of cotton suitable to the various districts of the Island.

TABLE XVII.
TABLE SHOWING THE RESULTS OBTAINED BY SEED SELECTION WITH THE UNDERMENTIONED VARIETIES.

Name or No. of plant.	Year.	Insect pests.	Fungoid and bacterial diseases.	Seed cotton per plant, lb.	Seed cotton per acre, lb.	Lint per acre lb.	Length of lint, mm.	Per cent. weak fibre.	Per cent. lint.	Strength.
Stirling S. I	1909	Aphis slightly	Black arm slightly	.60	(a) 2,592	651	52.2	22.1	25.1	Str.
	1910	Free	Angular leaf-spot slightly	.20	(a) 864	206	50.3	15.1	23.9	Str.
	1911	Aphis slightly	Angular leaf-spot slightly	.94	(c) 2,707	693	43.5	18.6	25.6	Str.
	1912	Aphis slightly, cotton caterpillar moderately (d)	Angular leaf-spot slightly, round- spot slightly	.84	(c) 2,419	629	46.2	24.1	26.2	Str.
Stirling S. II	1909	Aphis slightly	Black-arm slightly	.75	(a) 3,240	855	51.9	18.3	26.4	Str.
	1910	Free	Angular leaf-spot badly	.22	(a) 950	236	46.5	20.9	24.8	Str.
	1911	Free	Angular leaf-spot slightly	.75	(c) 2,160	555	43.8	19.4	25.7	Str.
	1912	Free	Angular leaf-spot slightly	1.10	(c) 3,168	788	44.7	28.8	24.9	Str.
Silket 38	1909	Free	Mildew and black-arm slightly	.41	(a) 1,771	416	51.3	17.9	23.5	V. str.
	1910	Free	Angular leaf-spot slightly	.43	(a) 2,074	635	44.9	19.8	30.6	F. str.
	1911	Free	Angular leaf-spot slightly	.78	(b) 1,123	292	42.6	19.4	26.0	F. str.
	1912	Aphis slightly, cotton cater- pillar moderately, (d)	Angular leaf-spot slightly, round- spot slightly	1.07	(c) 3,081	742	44.0	23.2	24.1	F. str.
Florida	1909	Free	Mildew very slight, black-arm fairly bad	.47	(a) 2,030	559	48.4	19.1	27.5	V. str.
	1910	Free	Angular leaf-spot slightly	.41	(a) 1,771	370	47.4	21.7	20.9	F. str.

TABLE XVII.—Continued.

TABLE SHOWING THE RESULTS BY SEED SELECTION WITH THE UNDERMENTIONED VARIETIES.

Name or No. of plant.	Year.	Insect pests.	Fungoid and bacterial diseases.	Seed cotton per plant, lb.	Seed cotton per acre, lb.	Lint per acre, lb.	Length of lint, mm.	Per cent. weak fibre.	Per cent. lint.	Strength.
Florida ...	1911	Aphis slightly	Angular leaf-spot slightly	60	(c) 1,728	491	43.0	18.8	28.4	Str.
" ...	1912	Aphis slightly, cotton caterpillar moderately, (d)	Angular leaf-spot slightly, round-spot slightly ...	53	(c) 1,526	450	46.4	25.6	29.4	Str.
Waterford	1908	Free	...	...	...	...	41.8	19.1	...	str.
" ...	1909	Free	Mildew very slight, black-arm badly ...	62	(a) 2,678	661	49.9	14.3	24.7	V. str.
" ...	1910	Free	Angular leaf-spot slightly	43	(a) 1,858	405	48.7	19.0	21.8	Str.
" ...	1911	Free	Angular leaf-spot very slight	69	(c) 1,987	513	44.9	18.4	25.8	Str.
" ...	1912	Aphis slightly	Angular leaf-spot slightly	91	(c) 2,621	788	42.7	27.9	29.9	F. str.
Husbands	1908	Free	...	...	...	...	45.2	15.0	22.5	V. str.
" ...	1909	Free	Mildew slightly, black-arm fairly bad ...	84	(a) 3,629	789	55.5	15.6	21.9	V. str.
" ...	1910	Free	Angular leaf-spot slightly	79	(a) 3,413	669	42.9	26.0	19.6	F. str.
" ...	1911	Free	Angular leaf-spot slightly	54	(c) 1,555	384	45.2	18.8	24.7	Str.
" ...	1912	Aphis moderately, cotton caterpillar moderately, (d)	Angular leaf-spot slightly, round-spot moderately ...	94	(c) 2,707	697	45.1	24.5	25.8	Str.
Grant	1908	Free	Free	...	...	...	36.1	45.7	...	Str.
" ...	1909	Free	Free	55	(a) 2,376	658	38.7	26.7	27.7	Str.
" ...	1910	Free	Angular leaf-spot very slight	68	(a) 2,938	899	45.5	16.1	30.6	F. str.
" ...	1911	Free	Free	102	(a) 4,406	1,211	46.2	14.4	27.5	Str.
" (a)	1912	Aphis slightly, cotton caterpillar moderately, (d)	Angular leaf-spot slightly, round-spot slightly ...	1.11	(c) 3,197	765	44.2	19.3	23.1	F.

TABLE XVII.—(Continued.)
TABLE SHOWING THE RESULTS BY SEED SELECTION WITH THE UNDERMENTIONED VARIETIES.—Continued.

Name or Number of Plants.	Year.	Insect pests.	Fungoid and bacterial diseases.	Seed cotton per plant, lb.	Seed cotton per acre, lb.	Lint per acre, lb.	Length of lint, mm.	Per cent. weak fibre.	Per cent. lint.	Strength.
Grant (b) ...	1912	...	...	1.51	(c) 4,349	1,305	44.1	18.4	28.6	Str.
Antigua ...	1909	Aphis slightly, cotton caterpillar moderately, (d)	Angular leaf-spot slightly, round-spot slightly.	1.23	(a) 5,314	1,419	43.0	10.4	26.7	V. str.
" ...	1910	Free.	Mildew slightly.	.73	(a) 3,154	701	38.1	18.6	22.2	Str.
" ...	1911	Aphis slightly.	Angular leaf-spot moderate.	.66	(c) 1,901	424	44.2	18.9	22.3	Str.
" ...	1912	Free.	Angular leaf-spot slightly.	.89	(c) 2,563	510	45.2	21.2	21.1	Str.
" ...	1912	Aphis slightly, cotton caterpillar moderately (d)	Angular leaf-spot slightly. Rust slightly.	...	...	...	...	...	...	...
Hy. Gilkes ...	1909	...	...	...	...	...	49.4	17.7	...	V. str.
" ...	1910	Free.	Angular leaf-spot slightly.	.30	(a) 1,296	398	44.2	19.5	30.7	F. str.
" ...	1911	Free.	Angular leaf-spot very slight.	.58	(c) 1,670	489	45.1	20.0	29.3	Str.
" ...	1912	Aphis slightly.	Angular leaf-spot slightly.	.50	(c) 1,440	470	43.6	14.9	31.3	Str.
Thornhill ...	1909	...	...	...	...	...	47.7	...	...	Str.
" ...	1910	Aphis slightly.	Angular leaf-spot slightly.	.25	(a) 1,080	294	45.7	17.1	27.2	F. str.
" ...	1911	Free.	Angular leaf-spot slightly.	.51	(c) 1,469	399	45.8	21.1	27.2	Str.
" ...	1912	Aphis slightly, cotton caterpillar moderately (d)	Angular leaf-spot slightly. Rust slightly.	.90	(c) 2,592	677	47.2	23.2	27.0	Str.
Carrington ...	1909	Free.	Black-arm slightly.	2.36	(a) 10,280	2,745	49.3	17.3	26.7	Str.
" ...	1910	Free.	Angular leaf-spot slightly.	.66	(a) 2,851	881	46.2	24.9	30.9	F. str.
" ...	1911	Free.	Angular leaf-spot slightly.	.43	(c) 1,238	360	45.1	18.3	29.1	Str.
" ...	1912	Aphis slightly, cotton caterpillar moderately (d)	Angular leaf-spot slightly.	.80	(c) 2,304	585	45.0	29.4	25.5	F. str.

TABLE XVII.—(Concluded).

TABLE SHOWING THE RESULTS BY SEED SELECTION WITH THE UNDERMENTIONED VARIETIES.

Name or No. of plant.	Year.	Insect pests.	Fungoid and bacterial diseases.	Seed cotton per plant, lb.	Seed cotton per acre, lb.	Lint per acre, lb.	Length of lint, mm.	Per cent. weak fibre.	Per cent. lint.	Strength.
Heaton	1910	Free	Angular leaf-spot slightly ..	.57	(a.) 2,462	635	43.8	20.5	25.8	Str.
"	1911	Free	Angular leaf-spot slightly ..	.55	(c.) 1,584	428	43.0	18.8	25.7	Str.
"	1912	Aphis slightly ...	Angular leaf-spot slightly ..	.89	(c.) 2,563	698	42.9	21.5	27.2	F. str.
C. 106	1911	Free	Angular leaf-spot very slight ...	.46	(c.) 1,325	337	44.0	14.1	25.4	V. str.
"	1912	Aphis slightly, cotton caterpillar moderately (d).	Angular leaf-spot very slight ...	.90	(c.) 2,592	720	43.6	28.0	27.6	Str.

(a) Planted in rows $5\frac{1}{2}$ feet apart and 22 inches apart in the rows.(b) Planted in rows $5\frac{1}{2}$ feet apart and $5\frac{1}{2}$ feet apart in the rows.(c) Planted in rows $5\frac{1}{2}$ feet apart and 33 inches apart in the rows.(d) *Alabama argillacea* Hubn.

In February 1912, cotton plants attacked with the leaf-blister mite, *Eriophes gossypii*, were, I regret to say, discovered by Mr. H. A. Ballou, M.Sc., Entomologist of the Imperial Department of Agriculture, in the neighbourhood of the office of that Department. On Mr. Ballou reporting the circumstance to the Governor, a survey of the areas attacked was made, when it was found that a number of the fields of cotton along the western side of the island were infected. As soon as the infection was brought to the notice of the growers, a number of them readily agreed to destroy the attacked plants, so as to prevent the spread of the pest. Others however refused to do so, or to allow them to be destroyed. Consequent on the refusal of these persons to take or allow any action to be taken in the matter, the Governor asked the Agricultural Society to nominate delegates to a Committee which His Excellency proposed to appoint, to consider what steps should be taken in the matter. The President nominated a large and representative Committee, and at my request His Excellency asked Mr. Ballou to serve on the Committee. The Committee after carefully considering the matter recommended that on the cotton leaf-blister being found by inspectors to be appointed by the Governor, on any cotton plants, the owner should destroy such plants and receive compensation at the rate of three-fourths of their value. The quantity of cotton on the infected plants was to be based on the quantity of both matured and unmatured bolls of cotton found on the plants on the day of the inspection, and the value, on the average price paid the previous week for seed cotton by the cotton ginneries operating in the island. In due course a bill was submitted to the House of Assembly but which however, did not meet with the approval of the majority of the House. It may be here mentioned that fields of cotton which were only slightly attacked when the infection was first discovered, were later on so badly infected that in some fields it was difficult to find a plant not attacked.

What effect the infection of cotton leaf-blister mite will have on the cotton industry of the island it is impossible yet to say, but hitherto no cotton grown to any extent has on the average yielded sufficient lint from the first picking to be remunerative, and it has been only from the fact that a second and sometimes a third picking of cotton from the same plants has been obtained that the industry has been profitable. It would be a matter for very great regret if the cotton industry should cease to exist, as cotton is such an excellent rotation crop to grow on fields that are infected with the sugar-cane root fungus, (*Marasmius sacchari*), a fungus which, I regret to say, appears to be on the increase in Barbados. There is, however, one and only one chance, so far as I can see, of saving the situation, and that is, if it is possible, as it may be, to so improve one or more of the indigenous or hybrid cottons which appear to be resistant, if not entirely immune, to the attack of the cotton leaf-blister mite, until they give remunerative returns. This, as will be seen by the above, is being done, and so far the results have been satisfactory; some of the indigenous cottons even giving from one picking sufficient to make their cultivation remunerative.

SWEET POTATO EXPERIMENTS.

The experiments with the different varieties of the sweet potato were continued during the period under review, and the results are given in table XVIII. As will be observed therefrom the two best results have been obtained with seedling varieties grown by the Department. A number of these seedlings were grown in the hope that some of them might be resistant to the attacks of the scarabee which, as will be seen from the table, is doing so much injury at the present time.

TABLE XVIII.

RESULTS OF SWEET POTATO EXPERIMENTS REAPED NOVEMBER 1911

Names.	Weight refuse potatos per acre. lb.	Weight saleable potatos per acre lb.	Percent- age of potatos attacked by scarabee.	Yield for the 3 previous years per acre. lb.	Average yield per acre for 4 years lb.
Vincelonian No. 4	982	5,324	4.55	56,922	15,562
Vincelonian No. 12	2,548	3,766	29.62	51,309	13,769
India Red	1,337	4,217	46.59	44,637	12,214
Southern Queen (Strong Type) ...	2,160	2,651	20.97	38,757	10,352
Vincelonian	1,264	7,902	17.92	33,168	10,268
Vincelonian No. 16	946	4,741	21.74	35,250	9,998
Six Weeks No. 5... ..	2,197	2,790	5.26	35,823	9,653
Caroline Lee (not Barbados)	1,475	4,320	50.08	31,185	8,876
Vineless Bunch	1,994	4,431	21.62	30,936	8,842
Yellow Red	1,728	4,464	34.85	30,363	8,707
Pumpkin	648	9,612	21.49	25,086	8,675
Trinidad No. 1	1,710	4,230	29.79	28,593	8,206
Alabama	1,295	2,376	51.43	30,309	8,171
Norton	2,560	7,040	35.48	23,811	7,713
Kamelo	1,260	4,680	20.31	25,809	7,622
White Gilkes (3 mos.)	1,251	2,387	23.81	27,228	7,404
Red Nansemond	1,337	4,937	17.57	24,543	7,370
Ticotea	1,350	4,629	29.41	24,411	7,260
Peppers Choice	1,994	7,422	32.00	21,000	7,106
Six Weeks No. 9	2,713	1,607	25.86	26,508	7,029
Japan Brown	1,672	4,320	32.81	23,061	6,845
Carolina (Extra Early)	1,407	3,416	34.25	22,821	6,559
Yellow Strausberg	909	4,093	33.33	22,089	6,546
Red Jersey	1,937	5,512	30.56	20,229	6,435
Kala	810	2,790	16.67	22,782	6,393
Vincelonian No. 10	1,178	5,007	10.00	20,061	6,267
Thegania Red	1,920	3,360	37.50	21,423	6,196
Southern Queen (Weak Type)... ..	1,525	2,668	26.67	21,450	6,030
White Gilkes (6 mos.)	864	1,824	24.32	21,384	5,802
Florida	160	3,475	10.00	19,623	5,775

CASSAVA EXPERIMENTS.

The cultivation of the varieties of cassava obtained from Montserrat and Trinidad, as well as those grown from seed were continued and the average weight obtained from a number of the varieties for the past four years is given in table XIX as well as the yield for the past season.

Owing to the poverty of the soil in which they had to be planted this season and to the unfavourable weather conditions the yields were low.

The following which have failed to give satisfactory results have been discarded, viz., Pacho, Blancita, Trinidad No. 2, Trinidad No. 3, Negrita No. 11, Negrita No. 12, Negrita No. 15, Negrita No. 17, Red Greenaway, Small Leaf and Jack Roe.

Recently another variety obtained from Panama has been added to the collection.

TABLE XIX.

Variety.				Mean results for four years 1908—1912. lb.	Results per acre for 1911—1912. lb.
SWEET VARIETIES.					
Trinidad No. 1	...	...	...	6,629	1,170
Paloma	...	...	...	5,826	1,720
Helada	...	...	...	5,480	2,016
Trinidad No. 2	...	...	...	5,262	3,574
Cabesa Dura	...	...	...	4,935	2,320
Pacho No. 3	...	..	...	3,014	1,103
BITTER VARIETIES.					
Blue Top	...	...	...	16,950	1,680
White Greenaway	...	...	...	16,904	4,320
BARBADOS 1910 SEEDLINGS				FIRST YEAR.	
Barbados 101	...	...	...	...	5,220
Barbados 102	...	...	...	...	4,905
Barbados 1010	...	...	...	...	4,320
Barbados 1012	...	...	...	...	3,150
Barbados 106	...	...	...	...	1,575
Barbados 104	...	...	..	...	1,440
Barbados 103	...	...	..	...	1,350
Barbados 107	...	...	...	...	1,305
Barbados 1011	...	...	...	...	1,035
Barbados 105	...	...	...	...	720
Barbados 199	...	...	..	...	720
Barbados 108	...	...	...	...	495

EXPERIMENTS WITH ECONOMIC COLOCASIEAE.

The experiments with the economic colocasieae were continued this year but as a number of them had given comparatively low yields on the average for the previous three years, only twelve varieties of those that had been cultivated for some time were replanted. Two other varieties, however, obtained locally have been added to the collection, so that there are now fourteen varieties under cultivation. Tables XX and XXI give the yields of tuberous rhizomes and corms for the past three years of the twelve varieties which have been under cultivation for some time and the Mistletoe tannia one of the new varieties. As a number of the tuberous rhizomes of the other variety, known locally as the Barbados Roasting Eddo, were stolen, it is impossible to form any idea as to its yield this year.

TABLE XX.

YIELD OF TUBEROUS RHIZOMES.

Name.				1909 lb. per acre.	1910 lb. per acre.	1911 lb. per acre.	Mean lb. per acre.
Malanga via Cuba	...	...	...	3,036	4,050	2,541	3,209
Grey Jack	...	...	...	2,958	2,835	1,600	2,464
Banana Tannia	...	...	...	2,063	2,565	2,560	2,396
Rolliza	...	...	...	2,200	3,150	1,440	2,263
China Eddo	...	...	...	2,510	2,520	1,620	2,217
Prieta	...	...	...	2,335	2,385	1,440	2,053
Punzera	...	...	...	2,608	2,970	540	2,039
Mistletoe Tannia	...	...	...	...	...	1,980	1,980
White Leftman	...	...	...	3,949	720	720	1,796
Blanca	...	...	...	2,452	1,665	1,186	1,768
Gengebrilla	...	...	...	1,653	2,025	1,344	1,674
Belembe	...	...	...	1,557	2,160	1,108	1,608
Button Tannia	...	...	...	2,355	1,620	847	1,607

TABLE XXI.

YIELD OF CORMS.

Name.	1909 lb. per acre.	1910 lb. per acre.	1911 lb. per acre.	Mean lb. per acre.
Rolliza	3,520	6,885	2,880	4,428
Banana Tannia...	2,296	5,085	4,160	3,847
Punzera	2,666	5,400	2,880	3,649
Button Tannia ...	2,452	4,590	3,896	3,646
Mistletoe Tannia	...	...	3,600	3,600
Belembe	1,763	3,780	3,988	3,177
Grey Jack	2,218	3,915	3,200	3,111
White Leftman...	1,049	5,400	2,880	3,110
Blanca	2,338	3,510	2,541	2,796
Gengebrilla	1,596	2,565	2,688	2,283
Prieta	1,090	2,385	2,720	2,065
Malanga via Cuba	506	900	847	751
China Eddo	576	450	900	642

EXPERIMENTS WITH VARIOUS LEGUMINOSAE.

A number of beans, peas etc., were grown again this year for the purpose of ascertaining whether the yield per acre of the edible varieties justified their being grown by the planters as a commercial undertaking, and the results calculated to the acre are given in table XXII. Among the beans are two varieties which are imported here, viz., Canada Bean Nos. 1 & 2, and which usually sell at 6c. per pound, and an effort is being made to acclimatise these varieties, in the hope that it might be possible to grow them as a rotation crop. Canada Bean No. 1 this year, as will be seen from the table, gave a yield of 763 lb. per acre. At 6c. per lb., the value would be \$45.78 per acre. A "Black Eye" pea obtained from Porto Rico, yielded 1,005 lb. per acre. The imported black eye pea usually sells for 4½c. per pound. The value therefore of this pea would be approximately \$45 per acre. These amounts are probably greater than the average price at which sweet potatoes sell per acre, so they might possibly be grown to advantage over large areas in the island, but particularly where it is now practically impossible to grow that root owing to the attacks of the scarabee (*Cryptorhynchus batator*). Anyhow from the results so far obtained it would appear to be worth while to continue the experiments.

TABLE XXII.

RESULTS OF EXPERIMENTS WITH LEGUMINOUS CROPS 1911--1912.

Name.	Weight per acre unshelled. lb.	Weight per acre shelled. lb.
Porto Rico No. 4.	2,445	1,005
Canada Bean No. 1	1,794	763
Unknown Cowpea (Black)	1,203	638
Porto Rico No. 2	826	544
Red Ripper	908	515
Increase Pea	1,244	485
Clay Pea	1,015	458
Canada Bean No. 2.	785	434
Iron Cowpea	720	411
Unknown Cowpea (Brown)	859	356
White Marrow Bush Bean	315	138
Porto Rico No. 1	252	146
Black Eye Cowpea	115	57
Jerusalem Pea	2,400	1,789
Velvet Bean	2,913	1,748
Lyon Bean	2,806	1,684

ONION INDUSTRY.

In March, with the kind help as usual of the editors of the various local newspapers, an offer was made to import onion seed for persons desirous of obtaining it. In response to that offer, orders were received for 1½ lb. of white and 1½ lb. of red onion seed. This, I am glad to say, is an improvement on the previous year, as only a quarter of a pound of each variety was ordered then.

As onions can easily be grown in Barbados, and as their cultivation at normal prices is satisfactory, and as I believe it would be possible to store them in the cold storage room at the Ice Factory, in the event of the price going too low, it is to be regretted that they are not cultivated to a greater extent.

MANGOS.

In addition to the mangos mentioned in previous reports as growing at Dodds, there have been added this year a grafted Goveneur, presented to the Department by Revd. Canon E. N. Thomas, and a Mulgoba imported from Florida. The addition of these two mangos makes thirty-five varieties now being cultivated at Dodds, most of which are grafted varieties of good quality, and from which, as they fruit, grafts will be taken for sale.

SHADDOCKS.

As there is growing at Codrington House a specially good variety of the shaddock, budded plants are kept on hand for sale.

YAMS.

During the year, through the courtesy of Mr. C. Noury, the Inspector of Agriculture, Dahomey, West Africa, six varieties of yams not, so far as I know, grown in the island were received from that country, and were, together with two varieties cultivated in this island, viz., Antigua and Grenada, grown for the purpose of ascertaining whether any of them were likely to be of value. The areas under the different varieties were comparatively speaking small, and as the yams when received from Dahomey were not in good condition, much importance cannot be attached to the results obtained this season. In fact, the idea was to grow them for a season so as to obtain good healthy sets for planting the following season. To obtain however some idea as to their relative value, the results have been calculated to the acre, and are given in table XXIII.

TABLE XXIII.

Name.	Weight per acre, lb.	Flavour.
Blanche Femelle	10,560	Excellent, specially bottom half.
Femelle	4,526	...
Antigua	3,724	Very good.
Male	2,640	...
Grenada	2,313	Good.
Male Blanche	2,237	Excellent.
Jaune Courte	2,160	...
Jaune Loungere	1,080	...

As opportunities offer it is proposed to grow other local varieties in addition to the Antigua and Grenada, so as to ascertain the varieties best suited to the district in which the experiments are conducted.

FODDERS.

A few years ago plants of the fodder grass *Andropogon annulatus*, Forsk. were obtained from St. Lucia, and these were increased by division of the root stock until sufficient were obtained to be grown in comparison with the Guinea grass (*Panicum maximum*, Jacq.) and the Sour grass (*Andropogon pertusus*, Willd). The plots were planted on September 11, 1911, and the grasses were reaped as soon as the plants seeded. The *Andropogon annulatus* and the Sour grass were reaped four times, while the Guinea grass was only reaped three times, owing to the fact that the plants were so short and stunted from the drought that they did not produce seed. The results are given in table XXIV.

TABLE XXIV.

Name.	Number of times cut.	Mean weight per acre, lb.
Guinea grass	3	4,501
Sour grass	4	4,392
<i>Andropogon annulatus</i>	4	3,757

As will be seen from the table, so far the Guinea grass has given the best results, but whether it will prove in the end the best to grow as a permanent crop under the soil and climatic conditions prevailing at the site of the experiment, remains to be proved. It is therefore proposed to continue the experiments for some time, so as to definitely settle the question.

THE EXPORTATION OF FRUIT AND VEGETABLES.

During 1910, 10,594 bunches of bananas were shipped through the Royal Mail Steam Packet Company to the United Kingdom, mainly, if not entirely from Sandy Lane Plantation. The shipments of mangos that are being made by the Local Department of Agriculture were continued and 102 crates containing 10,786 mangos were shipped to the British West Indian Fruit Company and the Army and Navy Auxilliary Co-operative Supply Ltd. These netted to the shippers after paying all expenses 2½ c. each.

During the year an effort was made to ascertain whether it was feasible to ship melons to New York during the winter months. At first, only a few melons were shipped and those were forwarded directly after they were gathered and arrived at New York in good condition. Subsequently, His Excellency the Governor was good enough to make enquiries of the British Consul at New York as to the best fruiterers to whom to forward these melons, and a number were grown on the lands of the Government Industrial Schools for shipment. The first few that were gathered were, as in the first instance, shipped directly after they reached maturity and the majority of them arrived at New York in fairly good condition, only a few spoiling. Those that were in good condition were valued at from 75 c. to \$1.00 each. Unfortunately however, when the melons ripened in numbers, there was no steamer available for their carriage, and they had to be placed in the cold storage room at the Barbados Crystal Ice Factory, and to be kept there, in some instances for over four weeks, before they were shipped. This resulted in practically all of them rotting on the voyage. Efforts have been made to get other steamships besides the Lamport & Holt Line to take the melons, but unfortunately up to the present without success. A number of experiments with the kind permission of the Directors, have been carried out in keeping melons in the cold storage room at the Barbados Crystal Ice Factory, with the object of ascertaining the best temperature at which to keep them. So far it has not been possible to keep them in good condition beyond about sixteen days. The experiments are however still being conducted.

SWEET POTATO AND YAM INDUSTRY.

The effort that was commenced in 1901 to work up an industry in sweet potatoes and yams with the United Kingdom has been continued and during the year forty-eight barrels of sweet potatoes and eleven barrels of yams were shipped to the West Indian Produce Association. It is to be regretted that such excellent roots and tubers as these should have such a limited market in the United Kingdom.

LOCAL AGRICULTURAL SHOW.

On Wednesday, December 6, the Local Agricultural Exhibition for peasant proprietors, tenants on sugar estates, etc., was, with the kind permission of Mr. G. C. Edghill, the Attorney of the estate, and with the assistance of a number of the neighbouring planters and others including the Hon. Sir Frederick J. Clarke, K.C.M.G., the President of the Agricultural Society, held at Lears plantation in the parish of St. Michael. Two hundred and twenty-four prizes amounting to £25 7s. 1d., were offered for milch cows, young oxen, small stock, poultry, vegetables, fruit, starches, Sea Island cotton, budded and grafted citrus and mango plants, etc. These included those offered in a special class for children of the elementary schools for plants grown by them in school gardens, and in half barrels, tubs, pots and boxes. In May 1911 seeds of the various vegetables usually grown in Barbados, such as beet, cabbage, carrots, lettuce, tomato, beans, etc., were with the assistance of the gentlemen forming the Committee of Management and others, distributed free of cost to the peasants, small proprietors and children of the elementary schools. Of the total quantity imported the Education Board were good enough to pay for seeds to the value of £1 4s. 4d. Diplomas of Merit of the Barbados Department of Agriculture were offered for competition to the large cultivators for the best stools of sugar-canes, Sea Island cotton, yams, crates of onions and bananas packed for shipment, etc. One hundred and five exhibits were sent in from the boys' elementary schools to compete for the forty-eight prizes offered. Of these twenty-nine were from St. Jude's Boys' School and so well were these various exhibits grown and shown that they gained twenty-three prizes. Diplomas of Merit of the Barbados Department of Agriculture were awarded to the following, viz: for

Plant sugar-canes (B. 6450),.....	Warrens plantation.
First ratoon sugar-canes (B. 6450),.....	Bagatelle plantation.
Sweet potatoes,.....	Applewhaites plantation.
He-goat,	Mr. Samuel Hampden.
Cassava starch,.....	Miss Constance Sealy.
Inarched mango plant,.....	Mr. J. A. Collymore.
School garden exhibits,.....	Mr. H. Williams, St. Jude's Boys' School.

On the whole, the show was a good one and the exhibits with a few exceptions were up to the usual standard, while the attendance was excellent. In the afternoon His Excellency the Governor, Sir Leslie Probyn, K.C.M.G., was good enough to distribute the prizes, and to address a few forceful remarks to those present, on the value of the Local Shows, and

the desirability of a larger number of the boys of the elementary schools competing than had done so in the past. In doing so, His Excellency pointed out that there were sixty-five elementary boys' schools in the island, and yet the total number of exhibits from these schools were only one hundred and five. That a greater number of exhibits could have been sent if more of the teachers had taken a greater interest in the matter was evident, from the fact that one school had sent in no less than twenty-nine exhibits, and had gained twenty-three prizes.

CANADIAN EXHIBITIONS.

For some years now it has been customary to send exhibits of the principal agricultural products of the colony to the annual Toronto National Exhibition, and this year samples of the different grades of sugar and molasses together with samples of rum, falernum, bitters, asphalt, crude petroleum, Sea Island seed cotton, cotton lint, etc., together with a number of framed photographs of the hotels and local industrial scenes were sent. There was also sent for free distribution a leaflet giving the names and numbers of the exhibits together with a hand-book entitled "The West Indies in Canada" prepared and forwarded by the Imperial Commissioner of Agriculture, in which was included a brief historical account of Barbados, together with a number of advertisements of the leading merchants, hotel keepers, etc. The exhibits were forwarded as usual, under the auspices of the Permanent Exhibition Committee, and were prepared and shipped by the Superintendent of Agriculture, who is a member of the Committee, and his staff. Mr. H. O. Ramsey, Chief Clerk to the Superintendent of Agriculture, acted as Honorary Secretary.

Messrs. Pickford & Black were good enough this year to again allow Mr. C. S. Pickford, their representative, to supervise the staging of the exhibits. This year it was decided that no awards should be made for any of the exhibits. This was a matter of some regret, as the exhibitors who were good enough to supply the exhibits expected, if they were of sufficient merit, to receive prizes or diplomas of merit.

FUMIGATION OF PLANTS, ETC.

From April 1st 1911 to March 31st 1912, 444 consignments of plants, seeds, other than cotton seed, were received for examination. Of these fifty consignments were either fumigated or disinfected. On January 18, a bag of banana suckers from Para and on February 17, a package of seed cotton from St. Kitts, which had been imported in contravention of the order promulgated by the Governor-in-Executive Committee on March 30, 1911, were destroyed. During the period mentioned above seventy-two consignments of cotton seed amounting to 23,514 bags were fumigated.

On April 13, 1911 owing to the prevalence of the large moth borer of the sugar-cane *Castnia licus*, Drury, in British Guiana, the importation of sugar-canes from that Colony except under special license of the Governor-in-Executive Committee were under an order made under sections 45 & 46 of the Trade Act 1910, (1910-15) prohibited. In the following November owing to a serious outbreak of the froghopper, *Tomaspis varia*, Fabr., in Trinidad, that order was repealed, and an order made to include Trinidad, promulgated in its stead.

In the January following, owing to further information being received to the effect that there were some 10,000 acres of sugar-canes in Trinidad attacked by the froghopper, of which about 1,000 were killed and 9,000 more or less injured, the Agricultural Society appointed a Committee to confer with the Superintendent of Agriculture as to whether further steps besides those forbidding the importation of sugar-canes should not be taken to prevent, if possible, the introduction of the froghopper into Barbados. In conjunction with the Superintendent of Agriculture, the Committee drew up a petition to His Excellency the Governor-in-Executive Committee, praying that in addition to sugar-canes such things as plants growing in pots or boxes or any plants of the order gramineae, which were likely to introduce the froghopper should be prohibited, not only from Trinidad and Tobago, but also from British Guiana and other parts of the South American Continent, from which the froghopper might be introduced. In that petition the Agricultural Society pointed out the serious injury that might be caused to the industries of a country by the introduction of insect pests and fungoid diseases; and drew attention to the fact that the introduction of the Gypsy Moth into some of the States of the United States of America which had escaped from Prof. Trouvelot, at Medford, Mass., was costing the Massachusetts Government large sums to keep it in check, as in 1906 that State spent \$225,000 and the Federated Government \$300,000 for that purpose. Further that the Canadian Water Weed (*Elodea canadenses*) which had been imported by a Professor of the University of Leyden for demonstrating purposes, had accidentally got into a canal and had spread to such an extent, that the town of Leyden spent about 40,000 guilders annually to keep this pest in check and there were some 500 towns similarly situated.

ARBOR DAY.

For several years now it has been the custom to observe November 9, his late Majesty's birthday as Arbor Day. As unfortunately owing to the demise of His Most Gracious Majesty Edward VII, on May 6, 1910, there is no reason now for observing

November 9, and as this day is near the end of the rainy season, it was decided in 1911 to observe the bank-holiday in October as Arbor Day, so that the young trees, etc., planted may have the benefit of a more extended period of the rainy season than previously. As usual a list of the plants available for free distribution was published in the *Official Gazette*, and the editors of several of the local newspapers were good enough to call attention to the fact that persons desirous of observing Arbor Day could obtain plants by applying to the Superintendent of Agriculture. This year 1,232 plants were distributed. The following is a list of the various plants offered for distribution:—

Adenanthera pavonina, Linn.	Hevea brasiliensis, Muel.
Anona cherimolia, Mill.	Indigofera arrecta, Benth.
Anona squamosa, Linn.	Inga vera, Willd.
Artocarpus incisa var seminiifera.	Jacaranda ovalifolia, R. Br.
Bauhinia Krugii, Urban.	Kleinhovia Hospita, Linn.
Blighia sapida, Kon.	Lagerstroemia Flos-reginae, Ritz.
Bombax Ceiba, Linn.	Lonchocarpus latifolius, H.B. & K.
Brunfelsia americana, Linn.	Lonchocarpus violaceus, H.B. & K.
Brunfelsia sp.	Malpighia sp.
Catesbaea spinosa, Linn.	Mimosa rubicaulis, Lam.
Caesalpinia coriaria, Willd.	Mimusops sp.
Caesalpinia sp.	Mimusops Elengi, Linn.
Calophyllum Callaba, Jacq.	Pachira aquatica, Aubl.
Cassia Fistula, Linn.	Pandanus utilis, Bory.
Cassia emarginata, Linn.	Peltophorum ferrugineum, Benth.
Castilloa elastica, Cerv.	Piptadenia peregrina, Benth.
Caesuarina equisetifolia, Linn.	Pithecolobium filicifolium, Benth.
Cedrela odorata, Linn.	Pithecolobium saman, Benth.
Citharexylum surrctum, Griseb.	Poinciana regia, Boj.
Copaifera Gorskiana Benth.	Sabinea carinalis, Griseb.
Cordia nitida, Willd.	Spathelia simplex, Linn.
Cordia sulcata, DC.	Spathodea campanulata, Beauv.
Cryptostegia madagascariensis, Boj.	Spondias lutea, Linn.
Dalbergia latifolia, Roxb.	Sterculia fulgens, Wall.
Doribeya spectabilis, Boj.	Swietenia macrophylla, King, in Hook.
Erythrina indica, Lam.	Tecoma leucoxyloa, Mart.
Funtumia elastica, Stapf.	Tecoma leucoxyloa, var.
Guaiacum officinale, Linn.	Tecoma smithii.
Gliricidia maculata, H.B.K.	Tecoma spectabilis, Planch & Linden.
Hæmatoxylon campechianum, Linn.	Tecoma stans, Juss.
	Triplaris surinamensis, Cham.

THE AGRICULTURAL CONFERENCE, TRINIDAD.

The eighth West Indian Agricultural Conference was held at Trinidad from January 23rd to 30th 1912, at which Barbados was represented by the following delegates, viz:—

Representing the Government.

*His Lordship the Bishop
of Barbados.*

The Right Rev. W. P. Swaby, D.D.

The Colonial Secretary.

Major Hon. J. A. Burdon, C.M.G., M.A., M.L.C.

*The Superintendent
of Agriculture.*

J. R. Bovell, Esq., I.S.O., F.L.S., F.C.S.

Representing the Agricultural Society.

The President.

The Honourable Sir F. J. Clarke, K.C.M.G., B.A., M.C.P.

Lt. Col. F. C. Trollope.

E. A. Robinson, Esq.

W. D. Shepherd, Esq., J.P.

J. L. Shannon, Esq., D. V. M.

Representing the Chamber of Commerce.

F. A. C. Collymore, Esq.

The Legislature voted a sum of £88 4s. towards the expenses of these delegates.

The delegates left Barbados by the Royal Dutch West India Mail steamer "Marowijne" on January 22, and arrived at Trinidad the following morning.

On their arrival they were met by the members of the Reception Committee among whom were the Hon. S. W. Knaggs, C.M.G., the Colonial Secretary, and Messrs. W. G. Freeman, J. B. Rorer and E. Tripp, the Secretary of the Agricultural Society.

The Conference was opened at 1.30 p.m. on that day by Sir George R. Le Hunte, G.C.M.G., Governor of the Colony. Then followed the Presidential address. A full and detailed account of what took place would be out of place in the annual report of this Department, but I would briefly mention that numerous papers were presented at the

Conference, a number of them being read in the abstract, the Superintendent of Agriculture contributing three on "A Comparison of Some Seedling Sugar-canes with the Bourbon Sugar-cane in Barbados," "The Cotton Industry in Barbados" and "The use of Entomogenous Fungi in keeping in check certain of the Scale Insects attacking Economic trees in Barbados."

Owing to the short time available for the discussion of the papers, the Hon. B. Howell Jones, a representative of the Board of Agriculture of British Guiana, towards the close of the Conference moved the following resolution viz:

"That the West Indian Agricultural Conference having assumed larger proportions than when first inaugurated, and as the time at our command is so short that papers when read cannot be fully discussed,

"Be it resolved—That this Conference recommends the Imperial Commissioner of Agriculture that in future Conferences the work to be done should be divided into sections, and that the President of the Conference should select a Chairman to "preside over each section." This was seconded by Mr. J. J. Nunan, the Representative of the Royal Agricultural and Commercial Society of British Guiana, and supported by Prof. J. B. Harrison and myself. After some further discussion on the matter, the resolution which was amended to read as follows, was unanimously adopted,

"That the West Indian Agricultural Conference having assumed larger proportions than when first inaugurated, and as the time at our command is so short that papers when read cannot be fully discussed.

"Be it resolved—That this Conference recommends the Imperial Commissioner that "some method of dealing with the increasing work of future Conferences should be considered before our next Conference."

During the Conference a report of the Committee on Entomological Research in the West Indies was read. This Committee consisted of Representatives of the Conference from the Imperial Department of Agriculture, from Barbados, British Guiana and Trinidad, who were concerned in entomological investigations. Among other subjects discussed were the proposals contained in a despatch from the Secretary of State for the Colonies, dated March 22, 1911, asking whether the West Indian Colonies considered it desirable to co-operate with the Entomological Research Committee. As Mr. G. A. K. Marshall, the Scientific Secretary of that Committee was present at the Conference, the Committee were able to confer with him on the manner in which co-operation might be carried out. In the report which was presented, it was pointed out that often West Indian entomological investigators had been hampered in their work by the difficulty experienced in the identification of insects of economic importance. Further, that it was of very great importance to obtain information with regard to the occurrence and control of insect pests in other countries, and that it was absolutely essential to secure adequate assistance along these lines, if the British West Indian Colonies represented at the Conference were to reap the full benefit of the efforts of their scientific workers. In order to supply this information, it was recognised that additional expense would have to be incurred by the Entomological Research Committee, who would be unable to undertake the extra work which it would entail, unless funds were provided to supply an assistant to their Scientific Secretary. It was therefore decided to suggest that the various West Indian Governments should be asked to contribute the necessary amount, which it was estimated would be, for the whole of the British West Indies £250 per annum.

During the time that the Conference was being held the Agricultural Exhibition held by the Agricultural Society took place to which the delegates were kindly invited.

In conclusion, I should like to place on record my appreciation of the great courtesy and kindness which in conjunction with the other visiting delegates, I received from His Excellency the Governor, the Department of Agriculture, the Board of Agriculture, the Agricultural Society and the inhabitants of Trinidad generally during my stay in the island.

LIVE STOCK.

The large donkey sire, El Rey, belonging to the Government, which was with the kind permission of Mr. S. S. Robinson, M.C.P., on service at Constant plantation at the end of the last financial year, was in July moved, at the request of Mr. L. S. Drayton, to Sion Hill plantation where he remained until March 1912. He was then at the request of Sir Frederick J. Clarke, K.C.M.G., moved to Long Bay Castle. This animal was imported for breeding mules, and was at first only kept for that purpose. Recently, however, owing to the small number of persons who have required his services for mule breeding, the Government have decided to allow him to be used for donkey breeding as well.

The smaller donkey sire, Don Cavalero, which belongs to a syndicate of planters, has been on service in various districts of the island during the year. A considerable number of foals have been born to this donkey since his importation, so that he is proving of considerable value in improving the size, etc. of the donkeys in the Island. It was mentioned in last year's report that sixteen jennie donkeys, seven Holstein cows and heifers two Holstein bulls and a Jersey cow, were, through the instrumentality of the Superintendent of Agriculture brought by Dr. J. L. Shannon, D.V.M., from the United States of

America for various persons. Subsequently, Dr. Shannon returned to the United States and brought with him twelve Holstein cows and heifers, and one Guernsey bull and four cows. Dr. Shannon who has kept an account of the progeny of these animals, informs me that the following pure-bred calves have been born since their importation, viz:—four Holstein bulls and fifteen heifers, and one Guernsey bull and one heifer. That in addition a considerable number of half-bred Holstein and a few Guernsey calves have been born as well, but that he was unable to state definitely the number. Mr. Murphy, however, the owner of the Holstein bull that is now alive, the other died, informs me that he knows of seventy four half-bred Holstein calves born as yet from the imported bull, and that within the next few months there is a probability of this number being increased to two hundred and fifty-four. Of the above, a pure-bred Holstein bull has been sold in Trinidad and one bull and two cows of the same breed in Grenada. It may be of interest if I mention that a relative of the Holstein bull belonging to Mr. Murphy gave 95·6 lb. of milk in one day; 25·53 lb. of butter in seven days and 103·54 lb. in thirty days. With regard to the sixteen imported jennie donkeys, three jacks and four jennies have been born to them. The importation of these animals from the United States will no doubt greatly improve the breeds of milch cows and the donkeys in the Island, and Dr. Shannon and those who ordered the various animals are to be congratulated on the success that has so far attended their efforts.

In last year's report it was mentioned that owing to the large infant mortality amongst the peasants, mainly due to the scarcity of milk, the Legislature had voted £4 for the purchase of a couple of young male goat kids, to be located in different districts of the island, with the object of improving the breed of goats. Of the amount granted £3 15s. was spent in the purchase of two three-quarter bred Toggenburg goats, (St. Ann's Robert and St. Ann's Walter) and the remainder was used for the purchase of a kid to be given Mr. A. P. Foster of St. Michael's Row in exchange for "Duke," who is a half-bred Toggenburg, three-eighths Anglo-Nubian and one-eighth native goat. The mother of this kid when fresh in milk gave nine pints per day. In addition to giving me such a valuable kid in exchange for a common-bred kid, Mr. Foster, as I mentioned last year, gave me for the Government a three-quarter Toggenburg male kid "Prince," and Mr. T. Manning of Messrs. Manning & Co., gave me this year a three-quarter bred Toggenburg male kid "Sir Vivian." These animals are now all on service and are being kindly kept by the following, viz:—

"St. Ann's Robert"	Mr. S. Browne, J.P.,	Kirton, St. Philip.
"St. Ann's Walter"	Mr. G. S. Evelyn, M.C.P.	Clapham, Christ Church.
"Prince"	Mr. J. C. Bovell,	Pickerings, St. Lucy.
"Sir Vivian"	Mr. E. L. Hollinsed,	Society St. John.
"Duke"	Mr. J. R. Bovell,	Codrington, St. Michael.

These animals should prove of an inestimable value to the peasantry in increasing their milk supply, and my best thanks are due to those gentlemen who have been so good as to help me in the matter.

HERBARIUM.

A few specimens of the local flora were added to the collection during the year, but owing to the number already collected of the commoner plants, these have not been very many. When suitable opportunities offer of obtaining the rarer plants in the gullies etc., in the higher parts of the island, it is proposed to try and add these to the collection.

INSECT PESTS AND FUNGOID DISEASES.

As there were several matters in connection with the insect pests and fungoid diseases in the island needing attention, as soon as Mr. W. Nowell, D.I.C., who had specialised in entomology and mycology at the Royal College of Science, London, was appointed Assistant Superintendent of Agriculture, I required him to give special attention to such matters as the life history in the field of the root-borer, *Diaprepes abbreviatus*, L., the keeping in check of scale insects, etc., by fungi, etc., and the following is the report which he has submitted on the work he has done since his appointment.

As will be seen therefore, attention has been given to a number of matters of special importance to the agricultural industries of the island.

As will be also seen the thanks of this Department are specially due to Mr. Guy A. K. Marshall, the Scientific Secretary of the Entomological Research Committee for being so good as to name certain insects sent him, and for getting Dr. Nalepa of Vienna, to undertake the examination of a number of mites found on various plants in Barbados which I had sent him.

I am also greatly indebted to Professor H. S. Fawcett, of Florida, for kindly reporting on specimens of fungi attacking scales sent him.

With regard to the black wasp *Tiphia parallela*, Smith, the larvæ of which have been found to be parasitic on the larvæ of the brown hard-back *Phytalus smithi*, Arrow, which is doing so much injury to the sugar-canes in Mauritius, I may mention that as the discovery is a matter of much importance to the inhabitants of Mauritius, His Excellency the Governor has asked the Secretary of State for the Colonies to be good enough to acquaint the Governor of that colony of the circumstance in order that if it is so desired steps may be taken to introduce the parasite into Mauritius.

PLANT PESTS AND DISEASES.

The principal matters under this heading which have received attention this year are :

- (1) The regular inspection and treatment of imported plants and seeds.
- (2) The fumigation of cotton seed imported for oil extraction.
- (3) The study and cultivation of fungi parasitic on scale insects.
- (4) The arrangement of the collection of insects maintained by the Department.
- (5) The preparation of a card catalogue of West Indian insects and fungi injurious to plants and animals.
- (6) Outbreak of the cotton leaf-blister mite.
- (7) Investigation of the habits of the beetle grubs found at the roots of sugar-cane.
- (8) Investigation of a number of cases of insect or fungoid attack reported to the Department by planters and gardeners, or observed by the officers of the Department.

INSPECTION OF IMPORTED PLANTS AND SEEDS.

Of the plants and seeds examined during the year the great majority fall into three classes.

(a) Small flowering plants, cuttings of shrubs, and ferns brought by passengers from other West Indian Islands and South America.

(b) Coconut seedlings and citrus plants from the islands.

(c) Rose plants, geraniums, carnations, orchids, vegetable and flower seeds from nurserymen in the United Kingdom or the United States of America.

They have been carefully examined and when necessary fumigated or disinfected. Plants of the first class are often infested with scale insects and several species have been found which are not known to occur in Barbados, thus recently a cocoa plant from St. Lucia was found to be infested with *Aspidiotus trilobitiformis*, Green, which does not seem to have been previously recorded from the West Indies. In cases where plants are packed in litter or other wrappings, they are treated to destroy any insects which may harbour in their coverings. Coconut plants are in all cases disinfected by soaking in Bordeaux mixture. In spite of these precautions there is still some chance of injurious insects being introduced in the soil accompanying the plants, as borers hidden in the tissues, or as eggs on the leaves or stems, but it would be difficult or impossible to guard against this without prohibiting altogether the importation of living plants. There is also some opportunity for invasion offered by imported fruit, which is not dealt with by the Department.

FUMIGATION OF COTTON SEED.

All cargoes of cotton seed imported into the island for purposes of oil extraction have been fumigated with sulphur dioxide by means of the Clayton Disinfector mounted on the barge Hygeia. Seed imported for planting purposes is spread out in thin layers and fumigated with cyanogen, experiment having shown that this has practically no effect on the germination of the seed.

FUNGI PARASITIC ON SCALE INSECTS.

Cephalosporium lecanii, the White Fringe fungus, is parasitic on the shield scales, especially on *Coccus (Lecanium) viride*, Gr. This is by far the most effective scale destroying fungus here. During the wetter months it is seen to be very widely distributed and very effective. It is easily seen and recognised by the white powdery fringe which radiates from the edge of the parasitised scale.

As was reported last year this fungus has been successfully introduced into several orchards from which it was found to be absent. In addition to the method of tying in branches bearing infected scales, it has been found possible this year to grow the fungus in quantity on artificial media and to spread it by spraying the spores where required.

Sphaerostilbe coccophila, the Red-Headed fungus. This fungus was brought to the office by Mr. F. L. Drayton, growing on *Lepidosaphes beckii*, (*Mytilaspis citricola*.) Search was made in the neighbourhood whence it came by Mr. Bovell and the fungus found plentifully on *Selenaspidus (Aspidiotus) articulatus* Morg, on *Funtumia elastica* in Sion Hill Gully, where it still occurs. During the year I have seen the fungus in two orchards in St. Thomas, in both cases on *Chionaspis citri* on stems of citrus trees. Although it is recorded as commonly attacking *Lepidosaphes beckii* and this species was abundant on the leaves of the same trees no signs of infection were found.

The fungus was noticed to be common on *Ischnaspis filiformis* on a number of young palms imported from Grenada. Experiments in spraying the spores of this species have so far been unsuccessful.

In September 1911, Mr. M. S. Goodman of the Department found a number of dead scales on a coffee tree in Queen's Park to be bearing an olive green fungus. Experiment showed that though the fungus would grow readily as a saprophyte on any nutritive medium it was capable of infecting and producing its spores on living scale insects in the laboratory. Spore spraying experiments were carried out on *Coccus viride*, and many immature insects were found dead with the fungus developing from them. While no plant was completely cleared, the fungus remained present and kept the

infestation down to small proportions. Some experiments on white fly were inconclusive as to whether the insects were actually killed by the fungus or only developed it after death from some other cause.

As an olive green fungus to which the name *Verticillium heterocladium* has been given is described as attacking *Aleurodidae* and *Coccidae* in Florida, and as the Barbados fungus in some stages resembles that genus in form, specimens were submitted to Prof. H. S. Fawcett, University of Florida, who has kindly replied to the effect that the fungus is quite distinct from the one referred to, and suggesting that it is a species of *Hormodendron*.

In October 1911, a number of twigs from a hedge of *Malpighia glabra* heavily infested with *Orthezia praelonga* were collected at Coverley. On examination the insects were found to be attacked by a fungus. On one twig bearing six severely infested leaves, only three living insects were found, and of these one bore the fructification of the fungus. The bodies of the dead ones were covered with oblong rusty red spores. At a later date the *Orthezia* had almost disappeared from the hedge.

Cultures of this fungus were made, after considerable difficulty had been encountered in finding a suitable medium, and the spores were sprayed amongst a number of trees of *Coccoloba uvifera* at Long Bay Castle, many of which had their leaves covered with *Orthezia praelonga*. A period of dry windy weather made the conditions very unsuitable for the experiment, and the fungus could not be recovered on a subsequent visit. Spores of a different fungus were found to be common, but there was no evidence that this was parasitic.

In December a fungus was found destroying large numbers of *Vinsonia stellifera* on lime trees in a gully near Strong Hope, St. Thomas. The whole scale becomes enveloped in a bright red stroma, which bears large numbers of conidia. No asci have been found and in their absence the fungus must be classified as a species of *Aschersonia*, a genus which is regarded as including the conidial stages of *Hypochochrella*. It is interesting to note that in the Agricultural News, 1911, p. 190, an *Aschersonia* said to belong to *Hypochochrella oxyspora* is recorded as occurring on leaves of various trees in Dominica and St. Lucia and being suspected of occurring on some scale insect.

Two species of *Aschersonia* are well known in Florida where they are used to check white fly on citrus trees.

It is well known that while fungoid diseases of insects are often found to exist to some extent it is only under specially favourable conditions, the principal of which is the presence of considerable humidity, that they become virulent enough to have practical importance. In considering the general question as to the possibility of controlling scale insects in Barbados by means of fungus parasites we must have regard to the present status of the fungi under natural conditions. We find that one of them, *Cephalosporium lecanii* is naturally abundant during the rainy season, and vigorously attacks certain species of scale insects, no doubt very materially reducing their numbers. It disappears from view during the dry season. If it is found as is probable that when suitable conditions return it takes a considerable time to re-establish itself, having survived only in especially favourable situations, then there is good reason to expect that by artificially distributing spores early in the season its usefulness may be very greatly increased. Further observations are required as to the conditions under which it will attack the various species on which it has been found. It would appear that certain species are but rarely attacked.

The *Sphaerostilbe* and the *Aschersonia* appear to be much less able to make headway under the climatic conditions of the island. While both are well established and flourishing in the gullies in which they occur, the first has only twice been found elsewhere, each time in a sheltered situation, the second has not been found elsewhere at all. Again, while the *Sphaerostilbe* has a large range of hosts under favourable conditions, it has been found here on at most three species, although others have been available in the immediate vicinity. Neither seems likely to have much practical effect under Barbados conditions.

It is possible that the fungus on *Orthezia* may be found to be much more widely distributed than is known at present. The conditions under which it was found to be effective were such as to suggest that it may have considerable power of resistance to exposure.

The *Hormodendron* is evidently a saprophyte with some faculty of parasitism and is so in a different category from those previously considered. Only lengthened observations can show how far and under what conditions it is able to exercise its parasitic powers.

As soon as weather conditions are favourable it is intended to continue the experiments in the propagation and distribution of these fungi with the benefit of the experience gained last year as to suitable methods of cultivation.

INSECT PESTS AND FUNGOID DISEASES SUBMITTED TO THE DEPARTMENT.

Scale Insects. Advice has been sought in a large number of cases respecting methods of dealing with scale insect attack, or the accompanying black "blight." In addition to the trials of scale destroying fungi, as mentioned elsewhere in this report

suitable sprays have been recommended where required, and help given in their preparation and application. Gardeners and fruit growers who work on too small a scale to justify the purchase of a sprayer of the knapsack type would do well to obtain an Abol Syringe, which will do the work of any ordinary syringe and in addition can be made to produce a very effective spray, while costing little more than the common type.

Thrips. The cacao thrips (*Heliothrips rubrocineta* Giard.) has been found doing considerable damage on the leaves of grape vine, croton and mango; *Euthrips insularis*, Frank, on rose trees and bonavist; another *Euthrips* on sweet potato; and *Heliothrips haemorrhoidalis* on fiddlewood (*Citharexylum*.)

Acarina. There being some apprehension among planters that the leaf blister mites noticed to be present on some common weeds (*Lantana*, *Eupatorium*, etc.) have some connection with the attack on cotton, a collection of the mites from various plants has been carefully examined. Morphological differences from the cotton leaf-blister mite were found in all cases, but they have been further submitted for diagnosis through the courtesy of Mr. Guy A. K. Marshall, Scientific Secretary of the Entomological Research Committee, to Professor Nalepa of Vienna, the recognised authority on the group.

A sugar-cane mite. Since May of this year an injury to sugar-canes caused by a mite has been under observation at Spencers. The mites are found in very large numbers on the surface of those young internodes of the cane which are still tightly enclosed in the leaf sheaths. The surface of the cane and the edges of the leaf sheaths are covered with bands and streaks of closely set minute blisters which are whitish at first, then red, and later, as they dry up, reddish brown. In severe cases the surface is considerably disfigured, but the injury is so superficial that it would appear to be of no direct economic importance, though it may possibly assume some significance in providing a means of access for fungoid disease. Specimens of the mite have been forwarded to Mr. Guy A. K. Marshall for transmission to Professor Nalepa for determination.

An interesting case of a natural check to an attack of red spider on sweet potato was observed recently at Spencers. The larvae and adults of a tiny rove-beetle (*Staphylinidae*) were observed in numbers on the infested leaves, and investigation showed them to be feeding, apparently exclusively, on the eggs of the red spider. A week later very few red spiders could be found.

Aphis (gossypii?) Another case of effective parasitism was observed early in the year at Dodds. There was a very severe aphid attack on melon vines grown for experimental shipment of the fruit to New York. It was proposed to meet the attack by spraying, but when ready to begin it was found that there was no need for it. In addition to the common Coccinellid beetles which as usual had rapidly asserted themselves, it was found that a Chalcid parasite was present in vast numbers. Over 400 parasitised aphides were counted on one leaf. The subsequent growth of the plants was practically unhindered.

Diseases of Grape Vine.

Black rot. A grape vine at Coverley to which the attention of the Department was called early in the year was found to be severely attacked by *Gloeosporium ampelophagum*, Sacc, one of the diseases known under the name of "black rot." Cutting back the affected stems, and spraying with Bordeaux mixture proved effective as a remedy.

Powdery mildew. Bunches of grapes sent by the Rev. P. C. Branch, Vicar of St. Philip the Less, were covered with the notorious fungus *Oidium Tuckeri* Berk, the powdery mildew. It is easily recognised by the white powdery looking growth on the surface of the leaves and fruit, which subsequently show brown patches. The simple and effective remedy for this disease is the application of "flowers of sulphur", which should be dusted on early in the morning while the foliage is moist, and the plant then exposed to direct sunshine. If possible a calm day should be chosen for the operation. In exposed situations spraying with "liver of sulphur" (potassium sulphide) one ounce to two gallons of water would be the better course.

Bordeaux injury. Attention was called in one case to a grape vine whose leaves and young fruit showed brown spots and patches believed to be due to disease, but found to be the result of the application of Bordeaux mixture. It cannot be too greatly emphasized that this fungicide should be applied only in a fine misty spray, and the application stopped as soon as the mixture begins to collect in visible drops on the leaves. The idea is that when dry the leaf should be covered with a fine whitish powder without the distinct spots produced by evaporation of large drops. Used otherwise the mixture however carefully prepared is very liable to injure any tender parts of the plant.

THE COTTON LEAF-BLISTER MITE.

On February, 27, 1912, Mr. H. A. Ballou, Entomologist to the Imperial Department of Agriculture, reported to the Colonial Secretary of this Island, that the Cotton Leaf-Blister Mite was present in a field on Bay Estate. This pest is well known in the other cotton growing islands of the Lesser Antilles, but was previously believed to be absent from Barbados. It is a very serious enemy to cotton growers, causing such severe

distortion of leaves and bracts as to completely cripple the plant. Owing to the shelter of the galls and folds produced in the leaf, the mite is effectively protected against the action of insecticides so that no remedial measures except destruction of the infected parts are possible.

It was found that at Bay Estate one field was rather seriously, another slightly infected. By the consent and ready co-operation of Mr. G. S. Evelyn, both were cleared and the bushes destroyed by fire, as were three smaller plots in the vicinity. Wider search was then made, extending over a period of several weeks, and necessitating the employment of two temporary assistants. It was eventually found that the pest was present to a greater or less degree throughout the cotton growing areas of St. Lucy, St. Peter, St. James, St. Michael and the western corner of Christ Church; the rest of Christ Church and the large areas of cotton in St. Philip were free. Within this area could be distinguished a smaller area of very severe infestation, comprising a district about two miles wide, extending from Bridgetown northward along the leeward coast for about six miles. It appears probable that this smaller area was fully infected at the beginning of the season, in which case the original outbreak could not be more recent than the season of 1910. It may have been earlier, though from indications of the rapid distribution of the pest it is at least possible that the smaller area could have been infected during the course of one season. There is no evidence as to the origin of the outbreak. If caused by the planting of infected seed, it was apparently not seed distributed generally from the cotton factories, since the evidence points strongly to origin within a small area. The mite is believed to be indigenous to the West Indies, and probably has natural means of distribution from one island to another. Actual demonstration owing to the minuteness of the mite is very difficult, but there is very strong indirect evidence that birds convey the infection within the island, and it would be equally possible for it to be brought here by a bird which had spent some time in one of the neighbouring islands. The cotton tree plover has been suggested as a bird whose habits would lend themselves to this. Very little information as to the course of an attack appears to have been recorded in the case of outbreaks elsewhere, but the conditions found during the present outbreak afford some important evidence. The stages noticed are as follows (1) *Full infection*. In many of the fields in the worst area the infestation was complete, practically every leaf was reduced to a crumpled mass. (2) *Partial severe infection*. In cases less extreme than (1), severely infested bushes were found in patches separated by plants quite free from disease, the number of these patches in a field might be one or several, each evidently representing an infection around one centre. (3) *Scattered infection*. This stage was the one preceding that just described. Examining every plant in a field, isolated plants, often widely separated, were found to be in some stage of infestation. In one field of six acres very carefully examined, only one leaf of one plant, a leaf situated on a rather high branch, was infected, and no other traces could be found. In somewhat later stages one bush would be found severely attacked, in which case those in its immediate neighbourhood would be showing signs of infection. Where an isolated plant was found in an early stage, the infected spot as in the particular case above was often found to be on a mature leaf which might be at any part of the plant, but where such a plant was infecting those about it the secondary infection appeared in almost every case to proceed upward from the ground, the small shoots with reduced leaves which break out from the stem near the base being very generally the first to show signs of disease.

It is evident from all this that the first distribution of the disease is discontinuous. The pest does not sweep across country from tree to tree, but breaks out in spots here and there, sometimes skipping a mile or more. The conditions in the western (leeward) corner of Christ Church may be cited as an example. At the extreme west, at Ventnor, in one field there was a badly infested patch, in another, a quarter-mile to the east of it, one infected leaf was found. The nearest cotton fields, at Mt. Clapham, about half mile to the north east, and near Worthing, the same distance to the south east, were free. But still further east, there was a patch in a field at Warners and a couple of plants in the middle of a field at Graeme Hall. To the north, there was a severe patch in a field at Upton, and a small one at Kent. The rest of Christ Church was at that time so far as could be ascertained, quite free of the pest, but it has since appeared (July, 1912), at Fairy Valley, another long step to windward.

The stage at which the mites become available for removal is reached when the galls on a leaf begin to dry up and crack open. The mites, of which there are a very large number in each gall are then set free and swarm on to the outside of the leaf. They do not possess wings, and their powers of locomotion would appear from their structure to be very limited. Yet the fact that the disease is spreading to adjacent bushes almost invariably begins at the bottom argues strongly that the mites are at least able, when they have dropped or been blown to earth to make for a stem and ascend it. The wind is generally credited with a great part in the distribution of this and similar mites, but that this does not afford a complete explanation, even of the infection of adjacent bushes is shown by the fact that secondary infection occurred all round the first infested plant. For the conveyance to greater distances we must look for some

living agent, since as has been mentioned above, the first beginnings of an attack were found far to windward of any known infestation. It is stated of the black currant gall-mite, a closely allied pest, that it deliberately waits for and attaches itself to passing birds and insects. Such an action is known to be an essential event in the life history of some insects, and there is no greater improbability in the case of the leaf-blister mite. Its structure is admirably adapted to such a habit. At any rate, whether with its voluntary co-operation or not, there can be no doubt that birds or insects or both do carry the infection. The Barbados sparrow is quite common enough in the cotton fields to supply without seeking further a fully competent means of carriage while humming birds and various flower visiting insects could afford additional agents.

An interesting question arises as to the immunity of native cotton to the pest. When first investigated in Montserrat it was found that uncultivated native cotton was entirely free from the pest. (H. A. Ballou, West Indian Bulletin, Vol. IV, p. 282). Later the same author records that both wild and cultivated cottons are attacked, (Insect Pests of the Lesser Antilles, p. 47.) During the present outbreak notice has been taken of native cotton growing among infested Sea Island plants, and in the vicinity of infested fields. With one apparent exception no sign of infection has been noticed. In a small plot near St. Michael's Almshouse a number of young native bushes were growing unharmed amongst Sea Island plants which were all attacked. At Sandy Lane a plant of native type was growing from the same hole as a very badly attacked Sea Island plant, but although the branches were intermingled no traces of the pest could be found on the native plant. The apparent exception was at Porters Plantation where a considerable acreage of "tree cotton" to all appearance of native type is grown. The distribution of the pest there was quite different from that found anywhere else. In going about the fields a plant here and there was found to be fully infested, while those around it showed no sign whatever of the pest, although they must have been exposed to infection for a considerable time. At the time of writing, (July, 1912), the ratoons from these plants are still uninfected. The cotton plants at Porters are descended from a stock obtained by planting alternate rows of Sea Island and native, and the susceptibility of some of the plants and resistance of others is probably to be explained by the varying degree of admixture of these two types. At the same time it shows that plants to all outward appearance "native" may be susceptible.

In spite of the wideness of the attack it was regarded as possible and well worth the attempt to stamp out the pest, particularly as no other plant than cotton is known to be affected. During the course of the inspection as fields were found to be infected, the owners or managers were urged to dig up the bushes and burn them, a course which in many cases entailed but a small sacrifice, owing to the generally poor crop this season. Many realized the situation and readily complied, others refused. Partial action being useless, a Committee to consider how best to deal with the situation was appointed by His Excellency the Governor, and included the Attorney General, a number of nominees of the Agricultural Society, and representatives of the Imperial and Local Departments of Agriculture.

On the recommendation of this Committee, a Bill to make the destruction of infested cotton plants compulsory, and providing for the compensation of owners, was introduced into the Legislature. The Bill, however, failed to meet with the approval of the House of Assembly. The remedy for planters of long staple cotton to adopt to check the destructive powers of the pest is by picking infected leaves at an early stage and by abandoning the practice of ratooning. These being merely palliative measures there is every probability that in the course of a year or two the pest will be generally distributed throughout the Island.

FIELD INVESTIGATION OF BEETLE GRUBS ATTACKING THE ROOTS OF SUGAR-CANE.

Since February, 1912, a systematic enquiry involving weekly field work has been made into the habits of cane root grubs, especially those of the root-borer, or "lady-bird," *Diaprepes abbreviatus* Linn. The life history of this insect has been worked out by the Rev. N. B. Watson, F. E. S. (West Indian Bulletin Vol. IV), but there is still much information to be gained as to its position at various times of the year in relation to the crops attacked. The investigation is naturally still far from complete, but some points of interest may be discussed at this stage. The work has mainly been done at Spencers Plantation, Christ Church, which is situated in the area known to be most affected by this pest at the present time. The thanks of the Department are due to Mr. A. A. Evelyn, the manager of the estate, for having afforded every facility for the enquiry and for the keen personal interest he has taken in it, which has led to many helpful suggestions.

The period covered so far began with the crop season, and the most interesting questions which have arisen have been in connection with the effect of reaping the canes and the digging of the stumps. The grubs when feeding are found in or near the cane stools, many of them in tunnels in the bases of the canes. In the ordinary course of events, as they become fully fed, they disperse in search of moist soil in which to pupate

Where the soil is heavy and retentive few penetrate deeper than one foot, but in dry situations, as for example the margins of a steeply banked field, they may go into the third foot from the surface. They penetrate the stiffest moist clay with ease. They shape out a very regular oval cell and in this they can remain a long time either as grubs, or after the short pupal stage, as fully formed beetles. They have been found in the latter condition from the beginning of April on. Large numbers emerge after the first heavy rain in May or June, and are then found feeding and pairing on the leaves of sugar-cane, pea trees, Indian corn and Guinea corn.

After the canes are cut the stumps soon dry up and become infested with weevil borer. *Sphenophorus sericeus* Oliv. and at this stage very few root-borer grubs have been found in or about the stools. Careful search shows them to have dispersed in every direction through the soil, some as far as the middle of the bank separating two clumps of canes. It has been found that under these conditions the immature grubs form cells similar to those in which pupation takes place in which they are able to remain without food for a period whose limit is not yet determined, but which is known to extend over more than three months. Half grown larvae kept in captivity without food since April 17, were still alive on August 10, and digging operations in the latter month showed that there were still a number of resting larvae at a considerable depth beneath the situations of cane stools dug up in the early months of the year. Larvae taken from such cells have commenced to feed again when supplied with sweet potato or sugar-cane. In view of this dispersal it is clear that to be effective as a remedy the uprooting of the stumps must follow promptly on the cutting of the canes and that badly infested fields should be reaped as early as possible in the season. The stool should be dug out entirely with as many as possible of the surrounding roots. A number of grubs are usually exposed in the operation and if the stumps are left on the ground to dry up those feeding within issue from them. Reliance has been placed on ants and blackbirds to destroy these. Unfortunately, according to my observations though the blackbirds are generally on the spot when digging is going on they only pick up the exposed grubs and make no attempt to search for those which have taken shelter, as they very quickly do. The ants destroy some, but are often wanting. A few head of poultry would be more effective than either. To get anything like the full benefit from digging stumps they should be collected while still fresh and stacked on dry rocky ground which will afford the grubs no shelter. In any case it is certain that a large number of grubs escape the operation but their food supply is cut off and their development stopped for the time being. The length of time they can live without food is as yet undetermined and though it appears quite possible that some may continue to exist until the new crop is available, we may assume that the chances of such a transition must be fatal to many. Direct observation seems to show a considerable diminution of the grubs where stumps have been dug soon after reaping.

Probably the most hopeful means of checking the pest is to be found in the collection of the beetles. From the beginning of April onwards careful watch should be kept, especially after rain, and the beetles collected as soon as they emerge. They may be commonly found, often in pairs, hidden in the leaf bases of sugar-cane, Guinea corn and Indian corn. Their presence may often be detected by the indentations caused by their feeding on the edges of the leaves. They may also be collected from pea trees or other vegetation on the borders of the field. At Spencers this year nine thousand six hundred (9,600) were collected by boys in the course of one week. Those on the canes are most difficult to find, but obviously it is most important that they should be carefully gathered.

The position in which the eggs are laid on the canes has been discovered during the investigations. They are found towards the tips of the leaves, which are generally more or less split by the action of the wind. The beetle conceals its eggs between two overlapping split portions which it firmly cements together. There is so little sign of their presence that the collection of the eggs does not afford a practical means of control.

Undoubtedly, where it is practicable the most effective means of dealing with this as with other local pests and diseases of sugar-cane is the practice of rotation of crops. It is significant that in the eastern portion of the estate at Spencers, where the suitability of the ground for cotton growing has led to the alternation of that crop with sugar-cane, the root-borer is insignificant or absent.

It is only where root-borer is present in some abundance that it can be regarded as a serious pest, and where it does become abundant it can undoubtedly be checked where the trouble is taken to do it. This involves some amount of deviation from estate routine but that should not be impossible. It is not by casual measures taken when it happens to be convenient, but by vigorous action at the right time that success can be obtained.

Phytalus Smithi, Arrow.

No insect is more familiar in Barbados than the black hard back, *Ligyrrus tumulosus* and a similar but smaller beetle coloured light brown, sometimes known as the bronze or brown hard back is often noticed and sometimes abundant. While visiting the Local

Department of Agriculture when on his way to the Agricultural Conference at Trinidad Mr. Guy A. K. Marshall, Secretary to the Entomological Research Committee, and an authority on this group of beetles, recognised specimens of the brown hard back as being of the same species as that which has recently occurred in enormous numbers in Mauritius and the grub of which has done great damage to the sugar-cane there. Specimens were sent to him on his return to England and he replied that he had compared them with examples from Mauritius and was entirely satisfied that it is the same species, its name being *Phytalus smithi*, Arrow. It belongs to the same family *Melolonthidae* as the black hard back.

During the investigation of the root-borer at Seawell and Spencers a larva of Melolonthid type has been constantly found in small numbers amongst the fibrous roots of the sugar-cane. It was for some time confused with the larva of *Ligyris*, but later on pupæ and resting adults of *Phytalus* began to be found. This led to a comparison of the larvae with some which undoubtedly belonged to *Ligyris*. It was found that the larvae collected at the roots of the canes belonged to *Phytalus*, *Ligyris* being very rarely present in the cane fields though breeding abundantly in the soil underneath the stacks of cane leaves and other vegetable refuse. There is no reason to believe that *Ligyris* damages the growing canes in the smallest degree.

There are also found regularly in the soil near the cane roots a number of tough brown silk cocoons containing pupæ of a black wasp of the family *Scoliidae*, whose members are parasitic on beetle grubs. Adhering to the ends of these cocoons are often a few remains including the mandibles of the victim. Many of these have been examined and in all cases found to be those of *Phytalus* larvae. This wasp evidently has an important share in preventing *Phytalus* from becoming a serious pest here. The fact that there is an occasional noticeable increase of the beetle accords with what is known of the usual relations between a parasite and its host.

Specimens of the wasp have been bred out in the insectary and on June 19 after rain, numbers were seen on leaves of Guinea corn at Spencers, where they are still fairly abundant (early August).

Specimens were forwarded to Mr. Marshall at the British Museum of Natural History and were identified as being of the species *Tiphia parallela*, Smith.

Besides sugar-cane, the larva of *Phytalus* has been found feeding on the roots of bananas and of rose bushes with serious effects to the latter. Probably it is also responsible for other damage to garden plants which has been reported as due to a grub of this description.

Judging from the great variety in the size of the larvæ at any one time the broods would appear to be irregular. The first imagos seen above the ground this year were caught at light in early June.

(Signed) W. NOWELL,

METEOROLOGY.

The following are summaries of the observations recorded at the Government Meteorological Station for the year 1911, the details of which are given in Appendix I.

Barometric Pressure. During 1911, the average pressure corrected for temperature and gravity and reduced to sea level, was at 9 a.m. 29.900 inches and at 3 p.m. 29.839 inches; the highest recorded being 30.010 inches on July 5, and the lowest 29.734 inches on December 9. This year for the first time the barometric pressure has been corrected for gravity, and so the averages will be somewhat lower than in the preceding years. For the ten years 1902—1911, the average barometric pressure was, at 9 a.m. 29.954 inches and at 3 p.m. 29.890 inches. The highest pressure at 9 a.m. was 30.013 inches, and the lowest at 3 p.m. 29.820 inches.

Temperature. The average maximum temperature for the year 1911 was 83.8° F. and the average minimum 75.3° F. The maximum extreme for the year which was 89.1° F. was registered on August 10, and the minimum extreme which was 61.0° F. was registered on February 20. The mean average temperature was 79.5° F., and the highest range for the year was 22.9° F., and the average range 19.4° F. For the ten years 1902-11 the average maximum temperature was 84.2° F., and the average minimum 75.6° F. The average maximum extreme during the ten years was 87.1° F., and the minimum extreme 68.2° F. The average mean temperature was 79.9° F., and the average range 19.0° F.

Wind. The average velocity of the wind during 1911 was 11.1 miles per hour, the maximum being 22.9 miles per hour on June 19, and the minimum 3.7 miles per hour on September 6. The average velocity for the ten years ended 1911 was 11.0 miles per hour.

Rainfall. The Rainfall measured at the Government Meteorological Station during 1911, amounted to 49.7 inches. This fell on 164 days, the greatest fall being 3.18 inches on February 6, and the lowest .01 of an inch on June 15, July 5, August 4, October 16, and December 3 and 27.

Rainfall for the Island. The total average rainfall from 154 stations was 59.28 inches which fell on 166 days and was 2.54 inches below the average for the sixty-five years ended December 31, 1911, which was 61.82 inches. The details with respect to the number of days on which rain fell at each of the stations during each month of the year, the total rainfall for each month and in a number of instances, the height of the rain gauge above sea level, are given in Appendix II.

The rainfall for November and December 1910 and January 1911 being below the average, the sugar-cane cuttings which were planted in the latter half of November and December on the various estates on which the sugar-cane experiments are carried on, did not germinate as regularly as usual. In fact, at Husbands St. Lucy, so few germinated that it was decided not to reap the few clumps that reached maturity, as the results would have been valueless. At the end of January 1911 the young sugar-cane crop of the Island was on the whole irregular, but as the usual dry season, i.e., from the beginning of February to the end of May, was exceptionally wet, the rainfall for the four months being 15.85 inches as compared with 10.44 inches for the sixty-five years ended December 31, 1911, the cuttings that failed to grow, and which were replaced by "top" cuttings taken from vigorous plant canes germinated so satisfactorily that when the rainy season set in in June the young sugar-cane crop was regular and growing vigorously. From then on to the end of November the rainfall was, with the exception of that for August, which was low, above the average, so that at the end of November there was every prospect of the island making a more than average crop. Unfortunately however a drought set in from the commencement of December which lasted up to the date of this report, (March 31, 1912.) In consequence of this there is every indication that the crop of the island for 1912 will not be as large as the two preceding ones.

THE SUGAR AND MOLASSES CROPS.

For the sugar and molasses crop of 1911 there were exported; 7,135 hhds. of vacuum pan crystals, 23,413 hhds. of muscovado sugar and 84,887 puns. of molasses of the total value of £636,285, made up as follows:—

White crystal sugar	7 hhds.	valued at £	82.
Yellow " "	104	" " "	1,196
Dark " "	7,024	" " "	77,264
Muscovado "	23,413	" " "	210,717
	<u>30,548</u>	" " "	<u>£289,259</u>
Fancy molasses	59,820 puns.	valued at	£246,758
Choice "	25,067	" " "	100,268
	<u>84,887</u>	" " "	<u>£347,026</u>

Owing to the fact that at the present time a considerable quantity of "Fancy" molasses is manufactured direct from the juice of the sugar-cane it is impossible without equating the "Fancy" molasses so made into sugar to form an adequate idea of how the sugar crop compares with those of previous years. As 315 gallons of "Fancy molasses is equivalent to one ton of muscovado sugar and its molasses, and as one ton of sugar is equivalent to $1\frac{1}{2}$ hhds. of sugar, the 59,820 puncheons of "Fancy" molasses is equivalent to 23,863 hhds. of sugar. The total sugar crop for 1911 therefore if no "Fancy" molasses had been made would have been 54,411 hhds. that is 5,360 hhds. less than 1910.

JOHN R. BOVELL,
Superintendent of Agriculture.

REPORT FOR 1911. LOCAL DEPARTMENT OF AGRICULTURE, BARBADOS. HEIGHT ABOVE SEA-LEVEL 181 FEET.

APPENDIX I.

d to Sea-level, ed for gravity.		Temperatures.										Tension of Vapour			Humidity.		Wind.	Rainfall for 1911.	Number of wet days.
Highest.	Lowest	Maximum mean.	Minimum mean.	Maximum extreme.	Minimum extreme.	Maximum black- ened bulb 4 ft. from ground in vacuo.	Mean for month.	Range for month.	Dew point 9 a.m.	Dew point 3 p.m.	9 a.m.	3 p.m.	Mean.	9 a.m.	3 p.m.	Mean.	Velocity miles per hour.		
29-944	29-776	81.5	72.1	84.5	63.4	151.0	76.8	21.1	64.7	65.3	.611	.624	.617	62.9	61.6	62.2	13.8	1.69	13
29-954	29-753	81.2	72.5	83.9	61.0	150.0	76.8	22.9	66.7	67.3	.655	.668	.661	67.9	66.6	67.2	11.3	6.65	11
29-953	29-793	82.2	72.8	85.1	63.8	146.0	77.5	21.3	65.1	63.4	.620	.584	.602	62.8	55.8	59.3	11.0	1.61	8
30-001	29-767	84.7	75.6	88.5	66.4	149.0	80.1	22.1	66.4	66.3	.648	.646	.647	60.2	59.2	59.7	13.1	1.43	6
29-931	29-762	85.9	75.6	87.9	69.4	154.0	80.7	18.5	69.2	67.9	.713	.682	.697	64.5	60.3	62.4	10.5	2.04	12
29-999	29-832	84.4	76.4	87.9	68.8	147.8	80.4	19.1	69.9	69.6	.731	.723	.727	66.3	65.5	65.9	14.4	4.04	20
30-010	29-775	85.1	76.7	88.3	69.5	156.0	80.9	18.8	69.8	69.0	.728	.708	.718	65.8	61.6	63.7	12.1	2.74	14
29-915	29-758	85.4	76.9	89.1	70.4	152.5	81.1	18.7	70.6	69.8	.749	.728	.738	67.5	63.5	65.5	10.8	7.75	17
29-961	29-757	84.9	76.9	87.9	69.6	149.6	80.9	18.3	72.2	71.0	.790	.759	.774	71.2	67.9	69.5	8.5	7.58	17
29-966	29-749	85.1	76.6	87.3	69.4	154.6	80.8	17.9	71.5	71.1	.772	.761	.766	69.1	69.0	69.0	7.4	5.76	15
29-927	29-748	82.8	75.9	85.7	70.2	152.2	79.3	15.5	70.5	69.6	.746	.723	.734	70.8	66.7	68.7	9.2	7.20	19
29-959	29-734	82.6	75.5	85.5	66.8	144.0	79.0	18.7	68.5	67.1	.697	.664	.680	68.5	62.8	65.6	11.3	1.22	12
359-520	357-204	100.8	903.5	1041.6	808.7	1809.7	954.3	232.9	825.1	817.4	8.460	8.271	8.361	797.5	760.5	778.7	133.4	49.71	164
29-960	29-767	83.8	75.3	86.8	67.4	150.8	79.5	19.4	68.7	68.1	.705	.689	.697	66.4	63.4	64.9	11.1	49.71	164

BARBADOS RAINFALL

FROM JANUARY—DECEMBER

1911.

BARBADOS RAINFALL FROM

Name of Station.	Elevation. Feet.	January.		February.		March.		April.		May.		June.	
		Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
I. DISTRICT A.													
St. Michael.													
<i>Lowlands.</i>													
Bank Hall ...	...	14	1.69	12	5.93	8	1.05	11	1.58	15	2.05	19	4.77
Strathmore ...	...	9	2.34	10	6.39	5	1.33	7	2.10	10	2.06	16	6.16
Lower Estate ...	237	13	3.16	10	8.30	8	1.96	9	2.53	11	3.86	19	5.44
Haggatt Hall ...	52	13	2.34	11	6.68	9	1.96	8	2.15	11	2.03	16	5.40
Clapham ...	216	12	2.07	8	5.81	4	1.57	7	1.43	11	2.02	16	5.17
Government House ...	90	13	1.90	11	5.98	7	1.38	8	1.57	12	2.20	17	5.49
District A. ...	97	19	2.16	14	6.11	9	1.25	9	1.67	15	2.56	21	5.03
Central Police Station ...	...	14	2.07	13	6.53	6	1.38	10	1.85	11	1.63	22	5.82
Bush Hall ...	110	13	2.00	8	5.13	5	1.15	4	1.16	10	1.98	13	3.55
Grazettes ...	...	14	1.70	14	6.18	8	1.57	6	1.46	10	2.25	17	4.43
Dayrells ...	...	16	3.06	10	8.62	7	2.56	7	2.50	17	6.78	6	3.44
Fairfield ...	...	15	1.57	11	5.64	8	1.22	6	1.17	15	2.04	20	3.98
Waterford ...	...	13	1.88	10	5.97	6	1.15	5	1.51	11	1.94	17	4.20
Windsor Cot ...	...	17	2.14	10	6.31	9	1.45	13	1.67	12	2.36	20	5.39
Warrens ...	...	19	3.37	11	6.84	11	2.16	9	1.96	11	3.50	19	6.35
Neils ...	...	12	2.53	10	8.98	7	1.50	6	2.68	11	3.27	18	6.17
Canewood ...	...	5	1.36	5	6.05	5	1.65	3	1.98	5	2.46	12	5.19
Codrington House ...	181	13	1.69	11	6.65	8	1.65	6	1.43	12	2.04	20	4.04
Goodland ...	...	11	1.60	10	5.79	4	1.09	4	1.19	10	2.36	16	4.39
Penlee ...	...	15	1.92	8	6.03	8	1.27	9	1.49	14	1.35	16	5.43
		270	42.55	207	129.92	142	30.30	147	35.08	234	50.74	340	99.84
		13.50	2.12	10.35	6.49	7.10	1.51	7.35	1.75	11.70	2.53	17.00	4.99
II. DISTRICT B.													
Christ Church.													
<i>Lowlands.</i>													
Woodbourne ...	150	14	2.74	11	6.31	11	2.26	10	3.32	13	2.34	17	4.15
Lowthers ...	...	14	3.00	9	6.24	7	1.78	8	3.82	11	2.34	20	6.61
Seawell ...	...	10	1.40	8	5.69	12	1.72	10	4.63	12	1.43	15	4.37
Coverley ...	254	25	3.34	12	7.19	12	1.69	11	5.83	10	1.78	12	5.64
Searles ...	283	19	3.40	12	6.98	13	1.98	11	4.26	12	1.96	19	6.25
Balls ...	270	21	3.11	11	6.56	7	1.53	10	3.89	15	1.75	18	5.17
Lower Greys ...	...	14	1.88	9	6.55	14	2.54	10	3.79	14	2.60	17	4.42
Newton ...	...	12	3.10	10	7.36	12	2.56	8	3.82	12	2.02	17	6.64
Bannatyne... ..	207	10	2.41	9	9.70	2	1.55	7	3.85	8	1.62	16	7.63
Maxwells ...	20	19	2.97	13	5.79	4	1.25	11	2.38	13	2.02	18	5.82
Durants ...	...	20	2.71	12	6.09	5	1.24	8	2.99	13	1.75	18	5.53
Ridge ...	362	11	2.38	11	6.33	10	2.40	8	3.86	11	2.02	17	5.73
Bentley ...	169	11	1.55	10	5.62	13	2.53	11	4.17	14	2.65	20	4.99
Spencers ...	...	5	1.61	4	4.81	5	1.45	6	3.17	2	.65	7	3.39
Isleworth (Hastings) ...	...	19	2.05	11	5.29	9	1.47	10	2.05	12	1.51	20	5.02
Pilgrim Place ...	...	15	2.51	10	6.38	6	1.63	7	3.99	11	1.69	13	4.93
Frere Pilgrim ...	...	13	2.39	12	7.06	11	2.79	8	3.33	19	1.99	17	5.19
Graeme Hall ...	...	13	2.27	9	5.89	7	1.76	11	2.37	14	2.39	18	5.54
Kent ...	...	14	2.07	10	6.93	8	2.24	10	2.46	10	2.37	17	6.05
Yorkshire ...	...	10	2.21	8	6.29	12	2.44	7	3.50	9	2.24	17	5.01
Rycrofts ...	...	13	3.07	7	5.08	8	2.32	11	3.72	9	2.09	16	4.49
		302	52.17	208	134.14	188	41.13	193	75.21	244	41.21	349	112.57
		14.38	2.48	9.90	6.38	8.95	1.96	9.19	3.58	11.62	1.96	16.62	5.36

DIX II.

JANUARY TO DECEMBER, 1911.

July.		August.		September.		October.		November.		December.		Totals.	
Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
17	2.15	20	7.18	18	8.05	16	6.22	18	6.73	14	1.80	182	49.20
7	1.55	13	8.31	14	5.95	11	4.59	14	6.66	8	2.85	124	50.29
10	3.54	13	8.51	16	8.87	15	6.66	16	8.62	10	1.93	150	63.38
12	2.53	18	7.17	18	8.32	13	6.01	15	5.09	11	1.80	155	51.48
12	1.78	14	6.80	14	5.30	12	3.76	11	5.75	9	1.75	130	43.21
9	2.00	17	7.91	17	6.98	10	5.37	14	6.07	8	1.68	143	48.53
16	2.37	21	7.27	17	7.99	16	6.04	18	6.29	14	1.70	189	50.44
10	2.08	18	8.29	18	7.27	12	4.85	17	7.05	12	2.12	163	50.94
12	2.48	15	6.50	15	6.93	13	4.97	12	6.33	5	.66	125	42.84
11	3.64	15	7.04	15	7.00	13	6.12	11	6.00	6	1.24	140	48.63
8	3.16	13	7.45	15	9.75	11	5.99	14	9.10	6	2.14	130	64.55
12	2.38	24	7.50	18	8.06	16	6.21	22	6.01	13	1.33	180	47.11
10	1.83	15	6.74	15	7.81	13	5.80	14	6.30	11	1.32	140	46.45
12	1.95	17	6.60	18	6.48	14	5.00	13	5.15	11	1.59	166	46.09
10	3.28	17	8.39	13	8.24	15	5.74	15	7.93	12	2.58	162	60.34
17	3.31	18	7.57	15	8.56	11	6.10	15	5.91	10	1.72	150	58.30
7	2.45	9	6.70	10	6.03	10	4.44	14	6.19	4	.94	89	45.44
14	2.74	17	7.75	17	7.58	15	6.76	19	7.20	12	1.22	164	50.75
10	2.51	18	7.56	16	8.38	13	6.09	16	6.01	11	1.47	139	48.44
16	1.84	17	7.30	17	5.01	14	3.42	20	7.09	12	2.43	166	44.58
232	49.57	329	148.54	316	148.56	263	110.14	308	131.48	199	34.27	2,987	1010.99
11.60	2.47	16.45	7.42	15.80	7.42	13.15	5.50	15.40	6.57	9.95	1.71	149.35	50.54
11	2.12	14	6.10	11	6.71	16	9.04	13	6.72	12	2.30	153	54.11
14	2.96	17	7.45	13	7.09	15	8.40	13	5.62	8	1.67	149	56.98
11	2.31	16	6.68	17	7.57	18	5.93	15	6.20	13	2.29	157	50.22
11	2.80	15	6.76	18	7.60	20	6.38	15	6.48	12	1.96	173	57.45
18	2.53	18	7.32	17	7.50	20	6.78	20	5.94	13	2.16	192	57.06
15	2.29	17	7.08	14	6.45	...	...	...	...	...	...	128	37.83
12	2.58	13	6.39	17	7.00	15	7.26	17	5.88	10	1.33	162	52.22
13	2.64	18	7.41	15	8.12	14	6.68	14	6.23	10	2.98	155	59.56
9	2.11	10	7.81	11	8.06	10	6.22	10	7.97	6	2.03	108	60.96
11	2.16	16	9.75	13	6.30	15	4.58	12	7.70	12	2.78	157	53.50
15	2.42	21	7.92	15	6.86	17	4.54	12	6.33	15	2.64	171	51.02
12	2.62	15	7.17	15	7.16	16	7.18	14	6.08	10	1.77	150	54.70
14	3.62	16	6.66	16	8.46	16	7.72	17	6.14	10	1.91	168	56.03
5	1.69	8	5.34	8	5.89	12	5.40	7	3.87	6	1.73	75	39.00
16	1.58	18	7.52	16	4.66	14	2.88	17	6.51	18	2.06	180	42.60
13	2.46	19	7.08	15	6.23	17	7.32	17	5.88	13	2.32	156	52.42
12	2.72	15	6.72	15	7.41	17	7.40	18	6.42	8	1.78	165	55.20
16	2.34	16	8.51	13	5.22	12	4.56	17	6.94	19	2.19	165	49.98
...	...	14	7.31	16	7.56	10	4.05	16	6.68	10	1.81	135	49.53
13	2.59	15	6.49	17	7.16	17	7.32	15	6.31	8	1.52	148	53.08
11	1.58	16	7.04	13	6.37	13	6.73	14	6.20	8	1.52	139	50.22
252	48.13	327	150.51	305	145.38	304	126.37	293	126.10	221	40.75	3,186	1093.67
12.60	2.41	15.57	7.17	14.52	6.92	15.20	6.32	14.50	6.30	11.00	2.04	151.71	52.08

BARBADOS RAINFALL FROM

Name of Station.	Elevation Feet.	January.		February.		March.		April.		May.		June.	
		Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
(a) St. George. Highlands.													
Lemon Arbour ...	720	17	3·62	12	6·77	9	2·17	12	4·47	13	3·79	18	7·58
Ashbury ...	...	18	3·57	9	6·64	9	2·45	12	4·77	11	3·15	15	6·64
Cottage ...	720	21	3·44	14	7·21	11	2·74	7	3·34	13	2·98	17	8·21
Woodland ...	...	17	3·44	8	4·81	7	1·14	9	3·63	14	2·65	21	7·02
Ellesmere ...	...	18	3·08	13	6·30	9	1·65	12	4·50	16	2·28	20	6·13
Brighton ...	...	6	1·80	8	5·65	4	2·21	6	4·53	10	2·38	14	5·37
		97	18·95	64	37·38	49	12·36	58	25·24	77	17·23	105	40·99
		16·17	3·16	10·67	6·23	8·17	2·06	9·67	4·21	12·83	2·87	17·50	6·83
(b) St. George. Lowlands.													
District B. ...	...	16	2·41	13	6·90	13	2·64	10	3·34	15	3·09	21	5·76
Valley ...	...	15	3·31	12	8·27	10	1·92	7	2·54	11	3·61	19	5·50
Windsor ...	162	10	2·05	8	6·34	9	2·64	8	4·61	10	2·26	15	5·38
Salters ...	...	15	2·41	10	8·13	9	1·44	8	2·28	10	2·79	16	5·15
Byde Mill ...	...	11	2·04	9	5·98	10	3·04	8	4·76	8	2·75	11	4·32
		67	12·22	52	35·62	51	11·68	41	17·53	54	14·50	82	26·11
		13·40	2·44	10·40	7·12	10·20	2·34	8·20	3·51	10·80	2·90	16·40	5·22
III. DISTRICT C.													
(a) St. Philip. Highlands.													
District C. ...	505	16	2·95	13	7·04	8	1·80	11	6·65	14	3·55	22	6·41
Hill View ...	505	11	3·03	10	6·97	8	2·24	10	5·23	10	2·82	16	4·67
Mt. Pleasant...	507	15	1·92	11	5·19	10	1·37	8	4·05	16	3·46	14	4·42
		42	7·90	34	19·20	26	5·41	29	15·93	40	9·33	52	15·50
		14·00	2·63	11·33	6·40	8·67	1·80	9·67	5·31	13·33	3·28	17·33	5·17
(b) St. Philip. Lowlands.													
Three Houses ...	135	11	1·41	11	4·35	4	1·41	7	3·99	9	2·54	14	4·56
Sandy Hill ...	125	11	2·16	11	6·08	9	2·57	8	3·28	13	2·55	18	4·88
Kirton ...	74	15	2·48	11	5·61	9	2·27	12	3·05	15	2·42	19	5·79
Fortescue ...	150	7	1·20	10	3·56	6	1·32	9	3·96	8	2·47	16	4·92
Thicket ...	243	12	1·78	8	4·58	5	1·47	10	3·99	13	2·48	8	4·99
Bushy Park ...	161	10	1·56	11	5·26	9	1·85	10	5·17	12	2·55	17	4·88
Oughterson ...	291	12	2·05	13	5·45	10	2·19	9	5·13	12	2·33	20	5·09
Government Industrial School ...	210	16	1·72	10	5·92	10	2·29	11	5·91	16	3·14	22	5·41
Sunbury ...	...	11	1·81	12	5·53	11	2·76	9	4·52	11	2·90	17	4·31
Hampton ...	103	11	1·72	12	4·86	11	2·13	8	4·40	11	2·29	16	4·47
Carrington ...	110	12	2·17	12	6·36	7	2·10	10	4·91	10	2·44	15	5·28
Chapel ...	228	14	1·71	9	5·27	11	2·40	12	5·23	13	3·48	17	5·59
Edgecumbe ...	207	9	1·90	6	5·35	7	2·62	6	4·17	9	1·95	11	3·34
Foursquare ...	...	7	1·20	9	5·37	9	2·15	8	2·81	11	3·02	17	4·68
Summervale ..	...	14	2·59	11	6·76	11	2·37	10	5·35	13	2·61	18	5·35
Stirling ...	...	10	2·02	11	5·88	8	2·11	6	3·02	8	2·23	14	4·78
Palmers ...	...	12	1·91	11	4·35	8	1·25	8	3·61	9	2·82	16	4·92
Ruby ...	...	11	1·94	10	5·30	10	2·58	10	4·18	10	2·73	16	4·74
Senhouse Grove ...	...	10	1·89	10	5·30	11	2·14	8	3·50	12	2·29	18	4·36
Bayleys ...	128	6	1·50	7	4·34	4	·58	7	4·74	7	1·98	13	3·68
		221	36·72	205	105·48	170	40·56	178	84·92	222	51·22	322	96·02
		11·05	1·83	10·25	5·27	8·50	2·03	8·90	4·24	11·10	2·56	16·10	4·80

JANUARY TO DECEMBER 1911.

July.		August.		September.		October.		November.		December.		Totals.	
Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
13	2·86	21	8·78	16	8·90	21	8·13	13	6·56	12	3·67	182	67·30
11	2·60	23	8·38	17	9·31	20	8·00	18	6·83	15	3·74	178	66·08
12	3·34	17	7·88	16	11·02	18	8·38	15	7·28	13	3·27	174	69·15
12	3·63	17	8·31	16	10·42	20	9·66	15	6·78	13	2·32	169	63·81
16	2·80	20	7·97	19	8·61	23	7·64	19	6·75	12	2·58	197	60·29
11	3·36	12	7·02	15	7·91	15	8·84	12	5·93	6	1·75	119	56·75
75	18·59	110	48·34	99	56·17	117	50·65	97	40·13	71	17·33	1,019	383·36
12·50	3·10	18·33	8·06	16·50	9·36	19·50	8·44	16·17	6·69	11·83	2·90	169·83	63·89
15	3·28	22	7·20	20	8·60	22	7·46	19	5·85	18	2·17	204	58·10
11	2·92	17	7·74	16	9·01	14	7·23	15	6·44	13	2·04	160	60·53
10	3·40	14	6·55	15	8·30	16	8·53	13	6·39	7	2·28	135	58·73
9	2·48	16	6·98	17	8·44	12	7·21	16	6·30	9	1·56	147	55·17
9	2·90	12	6·59	13	6·87	16	8·08	12	5·76	6	1·43	125	54·52
54	14·98	81	35·06	81	40·62	80	38·51	75	30·74	53	9·48	771	287·05
10·80	3·00	16·20	7·01	16·20	8·12	16·00	7·70	15·00	6·15	10·60	1·89	154·20	57·41
15	3·71	19	9·03	20	12·12	21	9·96	16	4·87	17	3·69	192	71·78
13	3·08	12	7·14	16	10·17	18	9·30	14	6·07	10	2·20	148	62·92
15	2·13	18	5·95	17	7·72	17	6·65	15	4·35	14	2·53	170	49·74
43	8·92	49	22·12	53	30·01	56	25·91	45	15·29	41	8·42	510	184·44
14·33	2·97	16·33	7·37	17·67	10·00	18·67	8·64	15·00	5·10	13·67	2·80	170·00	61·48
9	1·92	11	5·97	15	7·99	13	5·90	12	4·23	7	·93	123	45·20
14	2·81	18	6·56	15	6·77	17	6·68	14	3·86	8	2·56	156	50·76
17	2·95	19	6·82	19	8·03	21	7·40	15	4·82	11	2·56	183	54·20
8	1·47	13	4·90	14	6·87	14	3·96	13	4·58	5	1·92	123	41·13
11	2·05	14	5·57	15	7·63	14	6·37	12	4·50	11	2·29	133	47·70
11	2·88	14	6·21	15	10·24	20	7·47	15	4·34	7	1·92	151	54·33
14	2·74	16	7·37	19	9·78	20	7·84	15	4·00	14	2·49	174	56·46
16	3·52	15	7·58	15	10·08	21	7·89	16	5·28	9	2·16	177	60·90
13	2·88	16	5·48	16	8·82	19	6·49	13	5·81	8	1·41	156	52·72
14	3·28	13	5·59	17	8·50	14	6·79	17	6·73	8	2·11	152	52·87
10	3·41	14	6·24	16	9·17	17	7·77	15	7·18	9	2·08	147	59·11
12	3·96	14	7·24	15	10·39	19	8·29	14	6·07	9	2·00	159	61·63
10	2·47	12	5·73	13	7·14	16	8·09	9	4·51	5	·94	116	48·21
8	1·47	13	4·90	15	8·95	20	9·03	15	5·71	11	2·06	143	51·35
14	2·58	17	7·77	15	9·87	19	8·54	16	4·60	9	2·42	167	60·81
13	2·58	14	6·30	13	8·16	14	7·36	15	4·52	8	2·70	134	51·66
15	2·03	15	5·38	15	6·82	18	5·14	13	5·01	13	2·37	153	45·61
15	3·62	12	6·54	16	8·94	17	8·48	12	4·39	9	3·17	148	56·61
17	2·81	17	6·38	14	8·32	17	7·13	15	4·83	9	2·18	158	51·13
4	·79	13	6·48	15	8·40	12	6·26	8	2·74	4	1·68	100	43·17
245	52·22	290	125·01	310	170·87	342	142·88	274	97·71	174	41·95	2,953	1,045·56
12·25	2·61	14·50	6·25	15·50	8·54	17·10	7·14	13·70	4·88	8·70	2·09	147·65	52·28

BARBADOS RAINFALL FROM

Name of Station.	Elevation.	January.		February.		March.		April.		May.		June.	
		Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
	Feet.												
(a) St. John. Highlands.													
Colleton ...	767	15	2.72	12	5.98	7	1.87	10	6.81	14	3.99	16	6.06
Society ...	570	13	3.25	9	5.57	6	1.35	7	4.79	13	3.33	18	5.61
Cliff ...	534	11	2.72	8	6.25	6	1.31	9	3.80	16	3.26	20	5.74
Ashford ...	606	20	3.06	14	5.96	7	1.34	10	4.93	14	4.03	18	6.62
Pool ...	716	16	3.25	12	5.65	10	2.76	9	5.12	12	3.79	17	6.56
Henley ...	553	18	4.02	12	5.90	10	1.31	10	4.43	16	3.40	18	6.17
Hothersal ...	742	16	3.26	11	6.42	9	1.84	13	6.33	14	4.91	19	7.05
Wake Field ...	707	17	2.79	10	6.13	9	2.21	10	5.61	14	4.04	12	5.33
Malvern ...	900	13	2.54	12	7.21	6	.98	11	5.46	11	4.74	14	8.03
Kendal ...	544	25	3.77	13	6.38	11	1.31	13	3.87	22	3.28	25	5.98
Claybury ...	750	14	2.49	10	5.37	7	1.58	11	5.05	13	3.85	17	6.54
Clifton Hall ...	...	16	3.29	14	5.62	8	2.04	9	5.69	7	3.71	13	7.35
		194	37.16	137	72.44	96	19.90	122	61.89	166	46.33	207	77.04
		16.17	3.09	11.42	6.03	8.00	1.66	10.17	5.16	13.83	3.86	17.25	6.42
(b) St. John. Lowlands.													
Codrington College ...	...	14	2.47	11	5.04	7	1.66	9	5.09	15	6.10	14	3.19
College ...	...	15	1.84	11	4.23	7	1.22	11	3.95	14	2.33	18	5.38
New Castle ...	238	18	1.86	14	5.12	10	.73	10	3.95	14	2.35	18	5.67
		47	6.17	36	14.30	24	3.61	30	12.99	43	10.78	50	14.24
		15.67	2.06	12.00	4.77	8.00	1.20	10.00	4.33	14.33	3.59	16.67	4.75
IV. DISTRICT D. St. Thomas. Highlands.													
Mount Wilton ...	987	20	3.20	13	9.00	10	2.19	13	6.86	15	5.46	20	9.02
Lion Castle ...	900	23	3.91	13	7.55	15	2.40	14	6.46	19	5.69	27	8.82
District D. ...	678	23	3.23	14	6.76	16	1.98	14	3.83	19	3.69	25	6.94
Farmers ...	903	13	2.76	9	8.14	3	.90	9	6.97	14	6.03	14	6.40
Cane field ...	1,024	11	2.38	7	7.01	7	1.34	7	5.15	12	5.84	14	7.10
		90	15.48	56	38.46	51	8.81	57	29.27	79	26.71	100	38.28
		18.00	3.10	11.10	7.69	10.20	1.76	11.40	5.85	15.80	5.34	20.00	7.66
(c) St. Thomas. Lowlands.													
Fisherpond ..	725	21	3.86	12	7.41	12	2.54	14	4.80	18	3.80	21	7.73
Hopewell ...	534	24	4.33	15	7.33	14	3.19	14	4.60	17	3.93	24	7.87
Welches ...	398	14	2.66	9	6.27	8	3.31	4	1.35	9	2.48	16	5.32
Bennetts ...	350	22	3.01	13	6.20	12	2.36	9	2.63	9	2.52	20	7.25
Bagatelle ...	...	26	4.05	17	6.09	14	3.55	14	2.25	19	2.65	27	7.14
Mangrove Pond ...	...	14	3.11	10	6.86	6	1.98	10	3.30	8	2.85	14	6.53
Strong Hope ...	590	15	4.64	7	6.13	6	2.48	7	5.20	7	3.21	19	8.28
Clifton ...	...	22	3.72	13	7.55	14	2.16	12	5.07	14	4.44	19	7.62
Cleremont ...	756	12	2.14	9	5.44	4	1.64	4	1.23	12	1.92	16	5.03
Cane Garden ...	360	20	3.03	11	6.25	12	2.41	12	2.37	12	2.94	21	5.45
Applewhaites ...	...	19	3.97	10	7.30	10	3.14	12	4.06	15	3.62	21	8.04
Hilloby ...	...	12	2.22	11	7.51	10	1.23	8	4.71	11	3.61	10	7.63
		221	40.74	137	80.34	122	29.99	120	41.57	151	37.97	228	83.94
		18.42	3.38	11.42	6.69	10.17	2.49	10.00	3.46	12.58	3.16	19.00	6.99

JANUARY TO DECEMBER 1911.

July.		August.		September.		October.		November.		December.		Totals.	
Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
8	2.04	16	7.24	13	8.42	20	6.91	14	6.73	6	2.41	151	61.18
11	2.22	18	6.66	16	8.79	17	6.01	15	6.48	10	2.96	153	57.02
7	2.81	13	7.31	12	8.42	17	7.34	12	5.09	7	8.84	138	62.89
14	2.27	19	7.03	16	8.65	20	6.42	18	6.29	11	2.50	181	59.10
8	1.81	19	7.63	14	8.50	17	5.45	14	6.51	14	3.51	162	60.54
15	3.52	20	7.69	18	9.19	20	7.82	13	6.54	9	2.57	179	62.56
17	2.41	19	6.95	18	7.27	18	6.00	19	6.78	13	3.88	186	63.10
15	2.46	16	2.96	15	8.99	16	5.59	13	7.14	9	2.22	156	55.47
13	2.88	16	8.82	19	8.80	22	6.80	19	6.58	15	4.20	171	67.04
18	3.61	21	7.46	18	9.18	24	7.91	21	5.87	14	2.54	225	61.16
13	2.82	18	9.70	17	5.33	16	10.53	15	8.47	11	3.35	162	65.08
12	2.70	15	6.65	15	6.58	17	6.82	17	5.53	11	3.21	154	59.19
151	31.55	210	86.10	191	98.12	224	83.60	190	78.01	130	42.19	2,018	734.33
12.58	2.63	17.50	7.17	15.92	8.18	18.67	6.97	15.83	6.50	10.83	3.51	168.17	61.19
12	2.36	17	7.47	16	8.83	16	6.16	15	7.03	10	3.40	156	58.80
12	2.08	19	5.94	17	7.24	15	5.42	18	6.46	8	2.65	165	48.74
16	2.23	16	5.09	17	5.90	20	5.80	18	4.78	15	3.23	186	46.71
40	6.67	52	18.50	50	21.97	51	17.38	51	18.27	33	9.28	507	154.25
13.83	2.22	17.33	6.17	16.67	7.32	17.00	5.79	17.00	6.09	11.00	3.09	169.00	51.42
14	2.82	17	14.08	18	11.15	22	7.48	19	7.98	16	3.84	197	83.08
20	3.23	21	13.73	22	11.19	21	8.30	25	9.61	22	3.97	242	84.86
22	2.93	25	10.58	21	7.97	23	6.17	25	8.04	21	3.04	248	65.16
10	3.86	20	12.82	19	12.22	20	4.95	16	7.20	17	3.66	164	75.91
13	2.51	20	14.28	18	10.41	24	8.11	18	8.95	17	3.63	168	76.71
79	15.35	103	65.49	98	52.94	110	35.01	103	41.78	93	18.14	1,019	385.72
15.80	3.07	20.60	13.16	19.60	10.59	22.00	7.00	20.60	8.36	18.60	3.63	203.80	77.14
17	3.26	21	9.26	17	7.76	15	6.82	18	8.19	16	2.93	202	68.35
20	3.54	25	9.02	18	9.30	20	7.08	22	9.20	21	2.82	234	73.11
9	2.37	18	8.37	14	7.52	11	4.50	16	6.63	9	2.09	137	52.87
14	2.57	20	9.49	18	6.60	18	6.15	19	8.52	16	2.49	190	59.79
22	2.89	29	8.39	21	6.81	21	5.76	22	8.97	20	2.02	252	66.57
12	3.08	18	9.96	13	7.53	16	7.22	18	9.75	13	3.03	152	65.20
13	3.59	15	9.09	14	10.20	11	7.00	15	8.99	10	2.45	139	71.26
16	3.11	20	11.46	17	9.97	17	5.62	19	2.84	19	2.84	202	66.40
12	2.57	13	7.69	13	6.15	11	4.18	13	7.44	7	1.15	126	46.58
14	2.60	22	7.18	19	7.61	16	5.01	13	7.09	16	2.06	188	54.00
14	2.90	21	8.35	17	10.58	14	7.03	13	8.29	13	3.40	179	70.68
9	1.94	14	8.38	16	9.92	12	4.14	16	4.87	11	1.48	140	57.69
172	34.42	236	107.54	197	99.95	182	70.51	204	90.78	171	28.76	2,141	746.51
14.33	2.87	19.66	8.96	16.42	8.33	15.17	5.88	17.00	7.56	14.25	2.40	178.42	62.21

BARBADOS RAINFALL FROM

Name of Station.	Elevation Feet.	January.		February.		March.		April.		May.		June.	
		Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
<i>(a) St. James. Highlands.</i>													
Spring Head ...	860	8	1·62	13	7·58	6	1·71	6	4·81	10	3·36	19	6·87
<i>(b) St. James. Lowlands.</i>													
Blowers ...	...	19	3·77	11	6·52	10	1·14	11	3·75	13	4·65	20	7·70
Hole Town Police Station ...	...	17	2·74	10	5·39	9	1·25	9	2·19	10	2·88	16	5·63
Porters ...	...	14	2·34	4	4·49	7	1·18	5	1·60	10	3·94	9	3·97
Apes Hill ...	...	19	2·78	12	8·46	7	1·06	10	5·77	11	4·96	14	7·90
Trents ...	...	14	3·06	11	5·67	6	·89	6	2·59	11	3·66	15	7·40
Westmoreland ...	...	11	2·47	9	6·82	6	1·39	9	2·64	11	4·33	14	7·24
Lancaster ...	413	23	2·81	13	6·64	11	1·31	10	3·31	15	5·44	23	7·85
Mullineux ...	...	20	4·11	12	6·78	14	2·42	12	2·87	14	3·26	21	8·36
Norwood ...	...	8	2·00	5	4·70	5	1·80	7	1·70	5	1·30	12	4·19
Husbands ...	...	15	2·36	8	6·61	8	2·65	3	1·15	7	2·03	18	5·32
		160	28·44	95	62·08	83	15·09	82	27·57	107	36·45	162	65·56
		16·00	2·84	9·50	6·21	8·30	1·51	8·20	2·76	10·70	3·65	16·20	6·56
<i>V. DISTRICT E. (a) St. Peter. Highlands.</i>													
Nicholas Abbey ...	824	15	1·67	16	7·68	7	·78	10	4·03	11	3·77	15	4·96
Oxford ...	836	11	1·45	10	7·94	4	·85	6	3·16	11	4·65	14	4·79
Orange Hill ...	...	13	2·43	15	9·47	7	2·19	8	4·33	12	4·87	15	6·41
Mangrove ...	...	11	2·88	10	10·08	8	2·66	7	5·41	10	5·11	15	7·72
Black Bess ...	581	13	3·25	12	7·49	7	1·78	11	4·39	14	4·13	16	6·33
The Castle ...	700	15	1·64	15	7·51	7	·88	9	3·55	14	4·61	17	5·83
Ebworth ...	...	13	2·54	11	9·35	5	1·01	7	4·46	11	5·73	16	6·01
Rock Hall ...	...	19	2·67	16	7·70	12	1·68	14	3·79	17	4·06	22	6·32
		110	18·53	105	67·22	57	11·83	72	33·12	100	36·93	130	48·37
		13·75	2·32	13·12	8·40	7·12	1·48	9·00	4·14	12·50	4·61	16·25	6·05
<i>(b) St. Peter. Lowlands.</i>													
Bakers ...	380	11	2·03	11	6·71	9	1·76	7	2·91	14	3·62	16	5·65
District E ...	150	15	2·16	14	6·52	7	1·48	7	2·60	14	3·74	17	5·08
Heywoods ...	50	12	1·97	9	6·16	4	·88	6	2·60	11	4·03	14	4·13
Mount Brevitor ...	...	19	2·31	14	7·44	8	1·60	6	4·28	14	5·66	18	6·24
Alleynedale ...	...	15	1·78	15	7·07	10	1·09	13	3·26	18	5·31	24	4·74
		72	10·25	63	33·90	38	6·81	39	15·65	71	22·36	89	25·84
		14·40	2·05	12·60	6·78	7·60	1·36	7·80	3·13	14·20	4·47	17·80	5·17
<i>St. Lucy. Lowlands.</i>													
Lamberts ...	350	13	2·51	12	6·80	5	·97	5	2·41	10	5·36	14	5·75
Mount Gay ...	...	6	2·42	11	6·51	4	1·27	4	1·71	10	4·86	13	4·76
Pickerings ...	71	17	1·95	14	6·99	9	1·00	6	2·03	14	4·75	19	4·95
Spring Hall ...	51	16	1·48	10	7·04	5	·64	7	1·94	13	4·71	16	5·27
Checker Hall ...	184	16	2·56	11	5·81	8	1·03	7	2·50	15	6·10	18	5·17
Husbands ...	184	16	1·60	10	4·57	11	·92	6	2·52	15	5·91	18	4·30
Collynns ...	...	12	1·92	11	7·11	6	·77	4	2·54	13	4·67	16	5·55
Friendship ...	...	16	2·34	11	5·65	7	·71	7	2·48	13	5·28	17	4·60
Cove ...	...	10	1·92	10	5·85	5	·85	8	1·66	10	3·63	17	4·50
Cluffs ...	...	13	1·46	8	6·33	6	1·03	4	2·19	12	4·41	16	5·70
		135	20·16	108	62·66	66	9·19	58	21·98	125	49·68	164	50·55
		13·50	2·02	10·80	6·27	6·60	·92	5·80	2·20	12·50	4·97	16·40	5·05

JANUARY TO DECEMBER 1911.

July.		August.		September.		October.		November.		December.		Totals.	
Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
15	3.56	17	9.52	17	8.30	18	4.10	17	6.29	14	4.21	160	61.93
16	2.52	22	11.39	20	8.91	21	5.31	19	9.41	19	3.17	201	68.24
11	2.15	16	8.73	17	8.84	14	4.58	17	7.82	12	2.74	158	54.94
6	1.44	15	8.73	11	9.84	7	2.90	12	5.44	4	1.57	104	47.44
13	3.17	19	13.42	16	9.28	17	4.77	16	7.82	18	3.86	172	73.25
10	1.86	16	9.43	16	9.27	11	4.63	17	7.84	14	3.16	147	53.46
9	3.50	18	10.61	15	10.15	12	3.95	14	5.88	13	2.35	141	61.33
17	2.85	23	11.82	19	10.33	21	4.50	21	7.60	20	2.65	216	67.11
13	3.27	20	10.91	16	6.80	12	5.50	10	9.82	10	2.66	174	66.76
11	1.66	15	7.97	11	5.74	16	4.80	13	7.37	8	1.88	116	45.11
11	2.36	15	8.61	15	8.03	12	4.73	15	7.12	6	1.42	133	52.39
117	24.78	179	101.62	156	87.19	143	45.67	154	76.12	124	25.46	1,562	596.03
11.70	2.48	17.90	10.16	15.60	8.72	14.30	4.57	15.40	7.61	12.40	2.55	156.20	59.60
10	1.94	18	7.53	16	8.62	14	5.40	19	7.16	17	5.01	168	58.55
9	1.40	16	6.80	15	7.41	10	5.87	14	6.42	7	3.38	127	54.12
7	2.98	17	9.59	14	9.10	12	6.45	15	10.87	9	4.97	144	73.66
7	3.21	23	12.28	22	9.46	20	5.00	21	8.00	19	4.50	173	76.31
14	4.02	14	8.95	15	9.09	16	3.96	16	6.53	15	3.16	163	63.08
9	1.94	19	6.95	16	8.70	16	5.86	18	7.51	14	4.47	169	59.45
10	2.35	16	7.42	13	8.50	10	4.41	16	9.18	12	3.54	140	64.50
16	3.27	24	9.91	23	8.03	20	4.56	22	8.25	20	4.56	225	64.80
82	21.11	147	69.43	134	68.91	118	41.51	141	63.92	113	33.59	1,309	514.47
10.25	2.64	18.37	8.68	16.75	8.61	14.75	5.19	17.62	7.99	14.12	4.20	163.62	64.31
14	3.21	17	8.51	17	8.58	18	3.78	15	5.34	14	2.39	162	54.49
14	3.53	22	8.29	19	8.26	13	4.57	19	7.87	19	2.35	180	56.45
9	2.39	15	6.77	17	6.59	12	4.11	14	5.71	6	1.60	129	46.94
9	2.39	15	7.36	12	7.37	8	4.94	15	7.30	8	3.81	146	60.70
14	1.80	14	5.91	16	7.65	13	5.79	24	7.67	16	3.20	192	55.27
60	13.32	83	36.84	81	38.45	64	23.19	87	33.89	63	13.35	810	273.85
12.00	2.66	16.60	7.37	16.20	7.69	12.80	4.64	17.40	6.77	12.60	2.67	162.00	54.77
6	2.69	12	6.44	15	8.94	12	3.75	18	6.53	10	4.11	132	56.23
9	2.17	16	7.52	14	7.25	13	5.16	16	6.11	8	3.44	124	53.18
10	2.41	18	7.06	13	7.27	12	3.33	17	6.54	11	2.56	160	50.84
16	3.00	17	4.88	19	7.36	19	3.79	20	6.71	15	3.14	173	49.96
13	1.86	17	8.25	15	9.85	15	5.50	20	7.92	12	2.82	167	59.37
12	2.22	10	6.10	15	9.18	11	5.67	17	6.36	10	3.10	151	52.45
7	2.07	7	5.36	5	5.95	10	3.22	15	5.32	11	3.78	117	48.26
8	2.17	12	5.80	16	8.06	13	3.82	18	6.47	8	2.42	146	49.80
10	3.63	17	5.02	18	7.09	14	2.89	19	5.11	12	2.92	150	45.07
7	1.99	11	4.45	12	6.49	10	2.88	14	4.76	10	2.77	123	44.46
98	24.21	137	60.88	142	77.44	129	40.01	174	61.83	107	31.06	1,443	509.65
9.86	2.42	13.70	6.09	14.20	7.74	12.90	4.00	17.40	6.18	10.70	3.11	14.430	50.97

BARBADOS RAINFALL FROM

Name of Station.	Elevation.	January.		February.		March.		April.		May.		June.	
		Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
	Feet.												
VI. DISTRICT F.													
(a) St. Joseph.													
<i>Highlands.</i>													
Blackmans ...	910	17	2.89	12	7.50	12	1.45	11	5.69	14	4.18	20	7.80
Blackmans House ...	960	23	3.85	14	7.30	16	1.64	13	6.37	17	5.04	25	8.15
Andrews ...	780	14	3.71	12	7.98	10	2.66	13	5.51	10	5.57	16	7.85
Lammings ...	1,040	14	2.55	10	5.84	1	1.47	10	4.73	13	3.44	17	5.26
District 'F.' ...	966	17	2.36	14	5.06	12	1.57	10	3.15	17	4.05	17	5.99
		85	15.36	62	33.68	59	8.79	57	25.45	71	22.28	95	35.05
		17.00	3.07	12.40	6.73	11.80	1.76	11.40	5.09	14.20	4.46	19.00	7.01
(b) St. Joseph.													
<i>Lowlands.</i>													
Freizers ...	...	6	1.63	7	7.02	4	1.20	8	3.67	12	4.30	15	7.23
Retreat ...	...	17	3.31	12	7.25	13	1.78	11	3.94	13	4.43	17	6.68
		23	4.94	19	14.27	17	2.98	19	7.61	25	8.73	32	13.91
		11.50	2.47	9.50	7.13	8.50	1.49	9.50	3.80	12.50	4.36	16.00	6.95
(a) St. Andrew.													
<i>Highlands.</i>													
Gregg Farm ...	...	23	2.38	15	2.18	11	1.06	9	4.50	15	3.22	20	6.55
Cleland ...	...	12	1.57	13	7.34	8	1.67	7	3.36	14	4.05	18	5.33
Bruce Vale ...	...	13	1.86	11	7.14	7	1.09	7	4.44	9	3.17	17	6.65
		48	5.81	39	16.66	26	3.82	23	12.30	38	10.44	55	18.56
		16.00	1.94	13.00	5.55	8.67	1.27	7.67	4.10	12.67	3.48	18.33	6.19
(b) St. Andrew.													
<i>Lowlands.</i>													
Haggatts ...	...	8	1.14	8	9.17	4	1.26	6	4.22	9	5.19	15	7.90
Greenland ...	93	7	1.26	10	6.80	6	1.35	2	2.40	9	3.05	10	3.60
Baxters House ...	...	21	2.19	15	6.97	14	1.26	9	3.51	16	3.52	21	6.86
		36	4.59	33	22.94	24	3.87	17	10.13	34	11.76	46	18.36
		12.00	1.53	11.00	7.64	8.00	1.29	5.67	3.38	11.33	3.92	15.33	6.12

JANUARY TO DECEMBER, 1911.

July.		August.		September.		October.		November.		December.		Totals.	
Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
16	2·83	19	11·37	19	10·06	27	6·35	25	7·13	20	3·92	212	71·17
19	2·85	21	11·05	22	10·42	27	7·06	25	7·20	18	4·21	240	75·14
12	3·37	19	11·32	15	10·49	18	6·29	21	7·34	15	3·25	175	75·34
16	2·23	17	8·70	13	5·40	18	3·24	19	3·87	12	2·40	168	49·13
15	2·70	22	7·90	18	6·54	21	5·78	21	5·35	20	4·11	204	54·56
78	13·98	98	50·34	87	42·91	111	28·72	111	30·89	85	17·89	999	325·34
15·60	2·79	19·60	10·07	17·40	8·58	22·20	5·74	22·20	6·18	17·00	3·58	199·80	65·07
12	3·12	15	9·55	16	8·28	18	7·02	18	5·94	15	4·76	146	63·72
18	2·47	21	10·12	21	9·45	24	5·72	22	8·14	13	3·38	202	66·67
30	5·59	36	19·67	37	17·73	42	12·74	40	14·08	28	8·14	348	130·39
15·00	2·79	18·00	9·83	18·50	8·86	21·00	6·37	20·00	7·04	14·00	4·07	174·00	65·19
8	2·55	21	11·11	19	7·27	18	4·54	17	6·26	13	3·86	189	55·48
11	2·58	19	6·19	16	8·52	19	5·44	22	8·99	12	3·39	171	58·46
19	3·21	17	6·88	16	6·56	14	6·57	21	6·85	14	3·38	165	57·80
38	8·34	57	24·18	51	22·35	51	16·55	60	22·10	39	10·63	525	171·74
12·67	2·78	19·00	8·06	17·00	7·45	17·00	5·52	20·00	7·37	13·00	3·54	175·00	57·25
7	2·52	16	7·13	11	7·42	16	8·50	18	10·57	12	5·24	130	70·26
7	1·50	8	3·89	8	6·10	11	4·98	19	8·40	8	2·97	105	46·30
21	2·66	23	6·69	20	6·85	22	5·70	22	6·38	19	3·51	223	56·10
35	6·68	47	17·71	39	20·37	49	19·18	59	25·35	39	11·72	458	172·66
11·67	2·23	15·67	5·90	13·00	6·79	16·33	6·39	19·67	8·45	13·00	3·91	152·67	57·55

SUMMARY OF BARBADOS RAINFALL

Name of Station.	No. of Stations.	January.		February.		March.		April.		May.		June.	
		Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
I. DISTRICT A. St. Michael.													
Lowlands ...	20	13.50	2.12	10.35	6.49	7.10	1.51	7.35	1.75	11.70	2.53	17.00	4.99
II. DISTRICT B. (a) Christ Church.													
Lowlands ...	21	14.38	2.48	9.90	6.38	8.95	1.96	9.19	3.58	11.62	1.96	16.62	5.36
(b) St. George.													
Highlands ...	6	16.17	3.16	10.67	6.23	8.17	2.06	9.67	4.21	12.83	2.87	17.50	6.83
St. George.													
Lowlands ...	5	13.40	2.44	10.40	7.12	10.20	2.34	8.20	3.51	10.80	2.90	16.40	5.22
III. DISTRICT C. St. Philip.													
Highlands ...	3	14.00	2.63	11.33	6.40	8.67	1.80	9.67	5.31	13.33	3.28	17.33	5.17
St. Philip.													
Lowlands ...	20	11.05	1.83	10.25	5.27	8.50	2.03	8.90	4.24	11.10	2.56	16.10	4.80
St. John.													
Highlands ...	12	16.17	3.09	11.42	6.03	8.00	1.66	10.17	5.16	13.83	3.86	17.25	6.42
St. John.													
Lowlands ...	3	15.67	2.06	12.00	4.77	8.00	1.20	10.00	4.33	14.33	3.59	16.67	4.75
IV. DISTRICT D. St. Thomas.													
Highlands ...	5	18.00	3.10	11.20	7.69	10.20	1.76	11.40	5.85	15.80	5.34	20.00	7.66
St. Thomas.													
Lowlands ...	12	18.42	3.38	11.42	6.69	10.17	2.49	10.00	3.46	12.58	3.16	19.00	6.99
St. James.													
Highlands ...	1	8.00	1.62	13.00	7.58	6.00	1.71	6.00	4.81	10.00	3.36	19.00	6.87
St. James.													
Lowlands ...	10	16.00	2.84	9.50	6.21	8.30	1.51	8.20	2.76	10.70	3.65	16.20	6.56
V. DISTRICT E. St. Peter.													
Highlands ...	8	13.75	2.32	13.12	8.40	7.12	1.48	9.00	4.14	12.50	4.61	16.25	6.05
St. Peter.													
Lowlands ...	5	14.40	2.05	12.60	6.78	7.60	1.36	7.80	3.13	14.20	4.47	17.80	5.17
St. Lucy.													
Lowlands ...	10	13.50	2.02	10.80	6.27	6.60	.92	5.80	2.20	12.50	4.97	16.40	5.05
VI. DISTRICT F. St. Joseph.													
Highlands ...	5	17.00	3.07	12.40	6.73	11.80	1.76	11.40	5.09	14.20	4.46	19.00	7.01
St. Joseph.													
Lowlands ...	2	11.50	2.47	9.50	7.13	8.50	1.49	9.50	3.80	12.50	4.36	16.00	6.95
St. Andrew.													
Highlands ...	3	16.00	1.94	13.00	5.55	8.67	1.27	7.67	4.10	12.67	3.48	18.33	6.19
St. Andrew.													
Lowlands ...	3	12.00	1.53	11.00	7.64	8.00	1.29	5.67	3.38	11.33	3.92	15.33	6.12
	154	272.91	46.15	213.86	125.36	160.55	31.60	165.59	74.81	238.52	69.33	328.18	114.16
		14.36	2.43	11.26	6.60	8.45	1.66	8.72	3.94	12.55	3.65	17.27	6.01

FROM JANUARY TO DECEMBER 1911.

July.		August.		September.		October.		November.		December.		Totals.	
Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
11-60	2-47	16-45	7-42	15-80	7-42	13-15	5-50	15-40	6-57	9-95	1-71	149-35	50-54
12-60	2-41	15-57	7-17	14-52	6-32	15-20	6-32	14-50	6-30	11-00	2-04	151-71	52-08
12-50	3-10	18-33	8-06	16-50	9-36	19-50	8-44	16-17	6-69	11-83	2-90	169-83	65-89
10-80	3-00	16-20	7-01	16-20	8-12	16-00	7-70	15-00	6-15	10-60	1-89	154-20	57-41
14-33	2-97	16-33	7-37	17-67	10-00	18-67	8-64	15-00	5-10	13-67	2-80	170-00	61-48
12-25	2-61	14-50	6-25	15-50	8-54	17-10	7-14	13-70	4-88	8-70	2-09	147-65	52-28
12-58	2-63	17-50	7-17	15-92	8-18	18-67	6-97	15-83	6-50	10-83	3-51	168-17	61-19
13-33	2-22	17-32	6-17	16-67	7-32	17-00	5-79	17-00	6-09	11-00	3-09	169-00	51-42
15-80	3-07	20-60	13-10	19-60	10-59	22-00	7-00	20-60	8-36	18-60	3-63	203-80	77-14
14-33	2-87	19-66	8-96	16-42	8-33	15-17	5-88	17-00	7-56	14-25	2-40	178-42	62-21
15-00	3-56	17-00	9-52	17-00	8-30	18-00	4-10	17-00	6-29	14-00	4-21	160-00	61-93
11-70	2-48	17-90	10-16	15-60	8-72	14-30	4-57	15-40	7-61	12-40	2-55	156-20	59-60
10-25	2-64	18-37	8-68	16-75	8-61	14-75	5-19	17-62	7-99	14-12	4-20	163-62	64-31
12-00	2-66	16-60	7-37	16-20	7-69	12-80	4-64	17-40	6-77	12-60	2-67	162-00	54-77
9-80	2-42	13-70	6-09	14-20	7-74	12-90	4-00	17-40	6-18	10-70	3-11	144-30	50-97
15-60	2-79	19-60	10-07	17-40	8-58	22-20	5-74	22-20	6-18	17-00	3-58	199-80	65-07
15-00	2-79	18-00	9-83	18-50	8-86	21-00	6-37	20-00	7-04	14-00	4-07	174-00	65-19
12-67	2-78	19-00	8-06	17-00	7-45	17-00	5-52	20-00	7-37	13-00	3-54	175-00	57-25
11-67	2-23	15-67	5-90	13-00	6-79	16-33	6-39	19-67	8-45	13-00	3-91	152-67	57-55
243-81	51-70	328-31	154-36	310-45	157-52	321-74	115-90	326-89	128-08	241-25	57-90	3149-72	1126-28
12-83	2-72	17-28	8-12	16-34	8-29	16-93	6-10	17-20	6-74	12-70	3-04	165-77	59-28

